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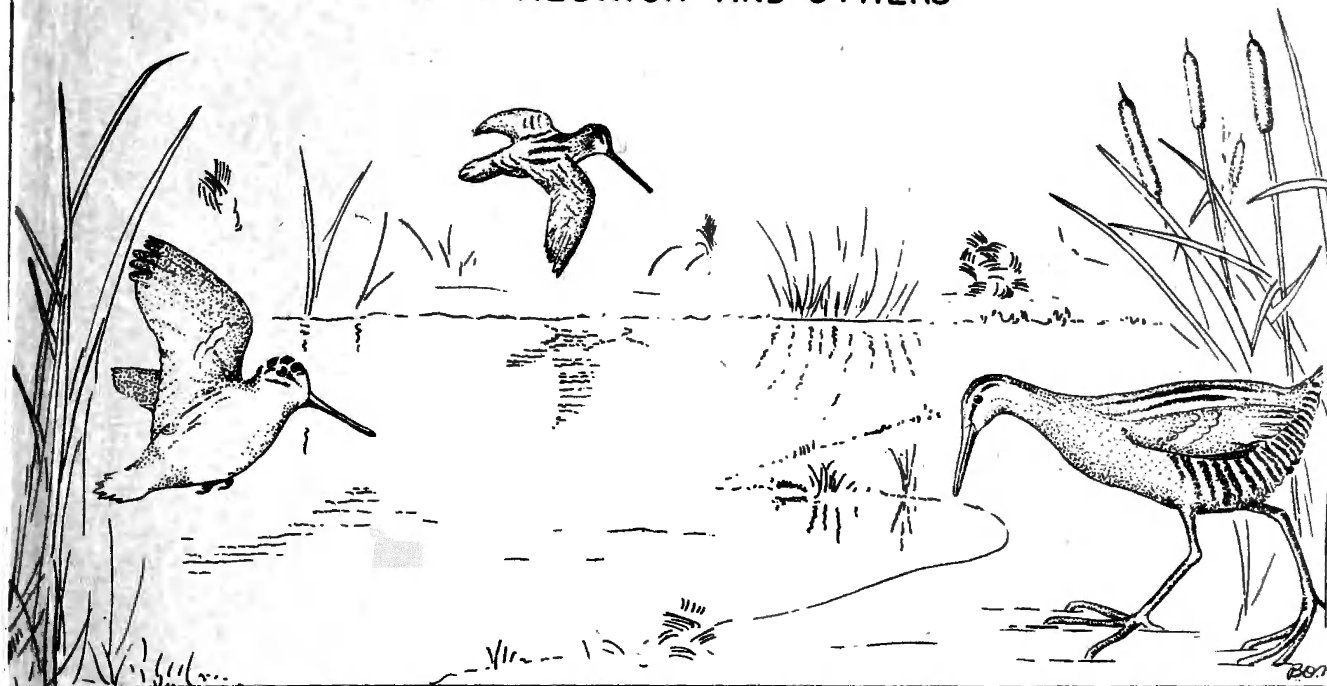


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# INVESTIGATIONS OF WOODCOCK, SNIPE AND RAILS IN 1951

by

JOHN W. ALDRICH AND OTHERS



## Special Scientific Report - Wildlife No.14

United States Department of the Interior.....Oscar L. Chapman, Secretary  
Fish and Wildlife Service.....Albert M. Day, Director

Canadian Department of Resources and Development.... Hon. R. H. Winters, Minister  
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January, 1952

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# C O N T E N T S

	Page
Introduction by John W. Aldrich . . . . .	1
Woodcock in South Louisiana During the Freeze of January-February, 1951 by John Lynch . . . . .	3
Wintering Woodcock Populations in West-Central Louisiana 1950-51 by Phil Goodrum and Vincent H. Reid . . . . .	10
Woodcock Singing Counts--Eastern Canada, 1951 by Victor E. F. Solman . . . . .	15
Woodcock Census Studies in Northeastern United States, 1951 by Howard L. Mendall . . . . .	19
Woodcock Census Studies in Delaware, Maryland, North Carolina, New Jersey, Pennsylvania, West Virginia, and Ohio, 1951 by P. F. English . . . . .	23
Woodcock Breeding Ground Studies in the Central Northern States in 1951 by John W. Aldrich . . . . .	27
Census of Woodcock Breeding Population in Vicinity of Patuxent Refuge, Md., in 1951 by Robert E. Stewart . . . . .	29
Studies of Breeding Woodcock in Massachusetts by William G. Sheldon . . . . .	30
Woodcock Banding with Bird Dogs by Bruce Wright . . . . .	45
Wilson's Snipe Wintering Ground Studies, 1950-51 by Chandler S. Robbins . . . . .	47
Wilson's Snipe Singing Counts in Eastern Canada - 1951 by Victor E. F. Solman . . . . .	50
Wilson's Snipe Breeding Ground Studies in Minnesota, 1951 by Chandler S. Robbins . . . . .	52
Wilson's Snipe Population at Gray's Lake, Idaho by Thomas D. Burleigh . . . . .	53
Clapper Rail Studies - 1951 by Robert E. Stewart . . . . .	56

## Maps

	Following page
Localities of Breeding Ground Counts of Woodcock . . . . .	14
Localities of Breeding Ground Counts of Wilson's Snipe. . . . .	49

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## INTRODUCTION

John W. Aldrich

U. S. Fish and Wildlife Service

Management of certain migratory gamebirds has benefitted probably more in 1951 than in any previous year from the efforts of many people to obtain quantitative data on the abundance of these species. For a number of years Howard L. Mendall (since 1936) at the University of Maine and P. F. English at Pennsylvania State College have organized woodcock-breeding-ground counts in the Eastern States. This year these counts totaled 61 in the northeastern states, and 42 in the central Eastern States. Woodcock-breeding-ground counts have also been carried on for a number of years in Canada, under the direction of the Canadian Wildlife Service and Provincial Game Departments. This year there were 32 counts in Ontario and the Maritime Provinces. These counts were compiled by Victor E. F. Solman.

Except for the work of William T. Marshall at the University of Minnesota and Robert A. McCabe at the University of Wisconsin, the important woodcock-breeding areas in the central Northern States have been largely uninvestigated up to this year. In 1951, six breeding-ground counts were initiated in Minnesota and twelve in Michigan through the cooperation of the game departments and individuals of those States.

The most significant basic research on woodcock during the year seems to have been that of William G. Sheldon of the Massachusetts Cooperative Wildlife Research Unit. This investigation of breeding behavior, by means of banding, indicated the need for a larger number of trips than the customary three in making singing-ground counts and particularly the desirability of making these trips as late as possible during the breeding season, even including the hatching period, to get a more accurate index to the abundance of breeding birds.

We are pleased to be able to report an increase in efforts to obtain quantitative data on the Wilson's Snipe. Nine breeding-ground counts were made in Minnesota by representatives of the game department of that State, and for the first time breeding counts were made in Idaho--two by Thomas D. Burleigh. Chandler S. Robbins has been assigned by the Fish and Wildlife Service to assemble data and conduct research on the snipe in the United States.

The snipe-census work on the breeding grounds of Ontario and the Maritime Provinces was continued this year under the direction of the Canadian Wildlife Service and Provincial game departments with Victor E. F. Solman compiling the results of the 14 counts. These are the most important quantitative data we have on the status of this species in North America, and since the major part of the breeding range of the Wilson's Snipe is in Canada it is there that expansion of breeding-ground counts should be greatest.

Up to the present time neither the woodcock nor the snipe singing-ground-count method appears to have been tested for statistical reliability. It is hoped that statistical tests may be made of the data already obtained before the next breeding season.

Important investigations on the wintering grounds of the woodcock in Louisiana were made by Phil Goodrum and Vincent H. Reid utilizing bird dogs to locate the birds. The bird dog has also been employed successfully by Logan Bennett and Bruce Wright in capturing woodcock for banding in the Maritime Provinces. Leslie Glasgow has been extraordinarily successful in capturing and banding large numbers of woodcock in their wintering areas in Louisiana by shining their eyes at night with a light worn on his head. No details of this work are yet available.

Wintering-ground inventories of Wilson's Snipe were also initiated this year by Chandler S. Robbins of the U. S. Fish and Wildlife Service in the most important wintering area in the United States, extending from southeastern Texas, eastward on the Gulf coast, to the Mississippi Delta. There are other known wintering concentrations of snipe in Mexico which may represent major populations of this species and which should be measured annually.

For the second year an important sample of the Clapper Rail breeding population was inventoried in the coastal marshes of eastern Virginia by Robert E. Stewart of the U. S. Fish and Wildlife Service. This gave, for the first time, quantitative data of a comparative nature which would be useful in the management of these rails.

Following are the reports of the various investigators who compiled data on the Woodcock, Wilson's Snipe, and Clapper Rail during 1951. The names of all persons contributing data obtained in the field are listed with their contribution. It is hoped that each year will show further increase in participation by qualified persons who are in advantageous positions to obtain the information on population changes which is basic to sound hunting regulations and other wildlife-management practices.

WOODCOCK IN SOUTH LOUISIANA DURING THE FREEZE OF  
JANUARY-FEBRUARY, 1951

John Lynch

U. S. Fish and Wildlife Service

Unusually cold weather swept Louisiana during the last week in January 1951. As a result, many woodcock were frozen out of their normal inland wintering range, and forced to move to the coastal parishes. The last time this occurred, during the freeze of January 1940, woodcock suffered serious reduction in numbers due to starvation and illegal hunting on the Louisiana coast. At the start of the 1951 freeze these birds seemed to be faced with a similar disaster.

The 1951 Freeze

A vigorous Cold Front moved into Louisiana on January 29. However, a residual pressure system along the Gulf slowed its forward motion to such an extent that it took 4 days for the front to cross the State. This front was accompanied by a wide area of precipitation, and backed by a very cold air mass. Much of this region experienced 2 days of freezing rain, followed by snow. At time of frontal passage, many stations reported the anomaly of severe thunderstorms with heavy snowfall.

Freezing temperatures were felt for 5 consecutive days along most of the Louisiana coast. Only the extreme southeastern portion escaped. Temperatures dropped below 10° F. in the central and northern part of the State during this period, and Shreveport recorded a low of 3° above zero. Much of the normal wintering range of woodcock was blanketed by ice and snow. The weather moderated on February 3, and there have been no serious freezes since that time.

Weather records show that this cold wave, while it lasted, was as severe as the disastrous freeze of 1940. Fortunately it was not so prolonged as the latter. Comparison of records shows (See table 1) that the critical period of the 1951 freeze lasted only 6 days (January 29 to February 3), whereas the freeze of 1940 persisted for 19 days.

Response of Woodcock

Normally, woodcock are not common in the coastal parishes of Louisiana. On January 30 of this year, however, they began appearing in numbers in wooded areas in Vermilion and Iberia Parishes, and by February 2 they were reported at Cheniere au Tigre, an island on the shores of the Gulf, separated from the mainland by a 30-mile strip of coastal marsh.

We walked out samples of the various habitats in this region that might be used by woodcock, and found some startling concentrations. In one 20-minute walk with a Labrador retriever (Feb. 1), 80 birds were flushed, an average of 4 woodcock a minute. Sixty-four woodcock were flushed out of one spot not over 150 feet across. We put in 11 hours during the 5 days of the freeze, walking strips the width of the range of the dog (about 50 yards in heavy cover, 100 yards in open terrain), and kicked out a total of 357 woodcock. This gives an average of 32.4 birds an hour, a very high figure considering the densities encountered in the normal wintering areas of central and northern Louisiana. However, it should be pointed out that the Vermilion-Iberia section is largely rice fields and open-prairie pasture. Wooded areas are confined to narrow strips along bayou banks and stream bottoms. Woodcock would be expected to pile up in the shelter of these wooded strips, rather than in open fields. Our sample strips ran for the most part through such wooded areas.

Game Management Agents Carlton and Lanier reported similar concentrations near Bayou Blou, and along the west side of the Atchafalaya Basin. Prof. Leslie L. Glasgow of Louisiana State University wrote (letter of Feb. 13, 1951) that woodcock of the "Florida Parishes" of southeastern Louisiana likewise moved ahead of the freeze, and remarked that woodcock appeared in back yards and gardens during this period.

Apparently some birds remained in their normal inland wintering areas. Vincent H. Reid (letter and report of Feb. 19, 1951), reported that he found as many birds on his census strips (in Vernon and adjacent parishes) during the freeze as he did on his best previous coverage. Carol Perkins of the Louisiana Department of Wildlife and Fisheries reported seeing a few woodcock in favorable situations in Allen Parish during the worst of the freeze. However, in view of the pile-up of birds in the coastal parishes, it is certain that a large portion of the woodcock population was moved southward by cold weather.

#### Emergency Habitats

The feeding and resting grounds utilized by woodcock in South Louisiana seemed adequate to tide them over the emergency. The favorite resting sites proved to be open "parked" woodlands, having a ground cover of soft grasses. By midday, sun heat warmed this grass cover surprisingly. Temperatures in the high 70's were recorded in this grass in the early part of the afternoon, despite the fact that the free air temperature was near freezing. Fewer birds were found in dense brush, and only occasionally were birds flushed in the cool shaded palmetto thickets. Many woodcock sought warm grassy roadsides that were sheltered from the wind. Some birds frequented farmyards and stock pens in the evening, probably attracted by worms and insects in manure piles.

Despite the freezing weather, numerous small water holes remained open in the woodlands. Sheltered spots in the rice fields thawed well during the day, and cattle kept some areas free of ice. At no time were these potential feeding areas so completely frozen up that woodcock were unable to probe. Preliminary examination of stomachs showed that worms and other subterranean foods were being taken. However the presence in these stomachs of adult insects, and the scarcity of probe holes and droppings in the feeding areas examined, suggest that woodcock may have done quite a bit of "dry feeding" during the emergency.

### Survival

All birds seen in the Vermilion-Iberia section appeared to be active and in good condition. They were usually quite gentle at first, and would fly only a few yards from the dog so long as they did not see the observer. Once flushed by humans, however, they became quite evasive, and flew for long distances. No sick or disabled birds were seen in this section, with the exception of one bird that had a sharp twig run into the left pectoral muscle clear to the breast bone. This bird was not emaciated, although the injury was old. However, its behavior was anything but normal.

Reid reported that no dead woodcock were found in Vernon Parish, but cites evidence of some loss in body weight during the freeze. Professor Glasgow noted that some emaciated birds were found in southeastern Louisiana, but in general the birds he handled in the course of banding work appeared to be weathering the freeze in good shape. He offered the interesting observation that "repeats" that were banded and retaken during the freeze showed no appreciable loss in weight since the time of their initial capture.

We collected 10 woodcock from two points in Vermilion Parish on February 2 and Game Agent Lanier turned over to us 15 birds he had confiscated from illegal hunters in Iberia Parish on that date. Since this was the last day of the critical period, body weights of these birds should give a fair indication of the effects of the freeze. We found that 12 females averaged 167.5 grams, with a high of 203.2 gms. and a low of 142.7 gms. Glasgow reported that the average for 106 females he examined during normal weather was 200.6 gms. Reid reported average normal female weights as 191.9 and 193.6 gms. for the past and current seasons respectively.

Our average for 13 males from the Vermilion-Iberia section was 128.6 gms. This compared with normal weights of 158.1 gms. (Glasgow, average of 83 males), and 155.1 and 158.5 gms. (Reid, averages for past and current seasons).

Our over-all average for the 25 birds weighed at the end of the critical period in the Vermilion-Iberia section was 147.2 gms. This is notably lower than the average weight of 178.0 gms. for 60 normal birds weighed by Reid during the past two years on the regular wintering grounds of west-central Louisiana.

From these data it is apparent that woodcock that had been driven south by the freeze lost some body weight (average of about 30 grams) during the emergency. However, this loss did not seem to be critical. None of the birds we examined was emaciated. While they had no body fat, they were plump and in excellent flesh. We are convinced, therefore, that woodcock did not suffer greatly from exposure or starvation during their emergency movement to the Louisiana coast. Had the 1951 freeze lasted another week, the story might have been different.

### Illegal Hunting

Woodcock were quite vulnerable to hunters in the Vermilion-Iberia section. The narrow wooded strips were easy to cover without a dog, and the birds made easy targets when first flushed in the open parked woodlands. Once disturbed, however, they became very wild and erratic, and were difficult to hit.

Shooting was heavy during the freeze, and undoubtedly quite a few woodcock were killed illegally during the critical period. However we find from personal observation, and from talking with wardens, that much of the bombardment during this time involved robins and other small birds. The run-of-the-mill "Meat-hunter" probably was more interested in robins than in the hard-to-hit "becasse." Also some of the shooting we heard represented illegal duck hunters, for ducks and blue geese literally swarmed into the rice fields during the worst of the weather. Rabbit hunters also contributed to the barrage, since the season for rabbit and quail was still open.

Woodcock are very vulnerable to night shooting, and headlight hunters contributed materially to the heavy kill during the 1940 freeze. We spent two nights working the Vermilion-Iberia section with a headlight, and saw no evidence of night hunting at this time. Woodcock were reported in farmyards and around watering troughs at dusk every evening, and could have been killed with ease. Doubtless some of these birds were killed, but a surprising number of farmers seemed to enjoy having the birds around.

Glasgow reports, however, that night hunting was quite prevalent in the areas he worked, particularly following the freeze.

While the illegal kill of woodcock in South Louisiana certainly was greater than it would have been had the birds remained in their normal range, we feel that it was not so great as to make serious inroads into the population as a whole. It should be remembered that a certain number of woodcock are killed illegally every winter, principally by quail hunters. The quail season in Louisiana remains open until February 10, and for all practical purposes, it might be said that the woodcock season is also open at least until that date.

#### Summary

Louisiana was swept by severe cold weather in the period between January 29 and February 3. Cold forced woodcock to leave their normal wintering grounds in inland Louisiana, and move southward to the coastal parishes. For a while it looked as though these birds faced a disaster similar to that experienced during the last big freeze in January 1940. Fortunately the 1951 cold wave, while severe, was not of such long duration.

Woodcock suffered some loss of body weight during their emergency sojourn in southern Louisiana, but at no time were they in serious danger from exposure or starvation. An undetermined number of birds was lost due to illegal hunting, but this loss seems not to be of immediate consequence to the total woodcock population.

Table 1.--The 1940 vs. the 1951 Cold Waves in South Louisiana

(Comparison of number of days with freezing temperatures, Lafayette Airport records)

		January																	February					
		14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5
1940	Max.	69	50	56	56	63	31	32	43	41	34	36	34	32	41	41	61	61	56	65				
	Min.	36	30	24	27	29	14	17	19	28	24	20	24	18	16	20	24	31	25	31				
1951	Max.																	40	33	30	26	40	61	
	Min.																	29	28	19	14	13	26	

The 1951 freeze in Louisiana was as severe as that of 1940 while it lasted, but fortunately was of much shorter duration.



Table 2.--Weights of Woodcock at the End of 1951 Freeze

(From birds collected in Vermilion and Iberia Parishes, February 2, 1951)

<u>Female</u>	<u>Male</u>
161.8 gms.	120.7 gms.
157.5	111.4 (injured)
171.6	105.6 (very small bird)
142.7	125.2
153.2	146.2
154.9	126.5
203.2	134.6
156.7	143.8
179.6	145.1
172.9	146.7
182.6	126.1
173.6	106.9 (small bird, in good flesh)
	132.5
Average weight of females	167.5 gms.
" " males	128.6 "

Over-all average of females and males 147.2 " (average of 25 birds)

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Comparison of above with normal weights

	<u>1951 freeze</u>	<u>Glasgow, SE La.</u>	<u>Reid, Central &amp; N. La.</u>
Females	167.5 gms.	200.6 gms.	191.9 gms. (49-50) 193.6 " (50-51)
Males	128.6 "	158.1 "	155.1 " 158.5 "
Both sexes	147.2 "		178.0 "

Average loss in South Louisiana birds during freeze 30.8 "

# WINTERING WOODCOCK POPULATIONS IN WEST-CENTRAL LOUISIANA

1950-51

Phil Goodrum and Vincent H. Reid

U. S. Fish and Wildlife Service

Observations were made on wintering woodcock populations in the cut-over longleaf pine area of west-central Louisiana from December 1950 through February 1951. Census work was accomplished in Vernon, Natchitoches and Rapides Parishes. Most of the activity was centered in Vernon Parish.

## Census Data

Method.--The census was carried on in conjunction with quail population studies. Quail and woodcock inhabit the same coverts in this cut-over longleaf area of Louisiana. The census was accomplished with the aid of bird dogs. As a rule, two dogs were used on each trip in the field. A record was kept of the time spent afield and the number of woodcock points made by the dogs.

Results.--The results of the census are summarized by weeks in Table 1. During the winter months 166½ hours were spent afield; 145 woodcock points were made by the dogs. On an hourly basis one woodcock point was made for every 1.1 hours afield.

The 1949-50 woodcock census figures are given in Table 2. By examining the totals in Tables 1 and 2, it is apparent that the overall figures show a similar winter woodcock population for the 1949-50 and 1950-51 season. A woodcock point was made by the dogs for every 1.1 hours of census in the two winters. On a woodcock per hour basis, one bird was flushed for about every hour of censusing in both seasons.

Counts of wintering woodcock in the west-central portion of Louisiana were begun in the year 1946. The results of the yearly counts are given in Table 3. The census figures show a woodcock point for every hour afield for the winters of 1947-48, 1949-50 and 1950-51. These figures are below the high count of 5 birds per hour in the winter of 1948-49.

Table 1.--Woodcock Census Winter 1950-51

Period	Hours afield	Number woodcock	Woodcock per hour
November 19-25, 1950	9½	2	.21
November 26-December 2, 1950	12	2	.16
December 3-9, 1950	14	6	.42
December 10-16, 1950	18	13	.72
December 17-23, 1950	7	3	.42
December 24-30, 1950	3	0	-
December 31, 1950-January 6, 1951	1½	0	-
January 7-13, 1951	18	4	.22
January 14-20, 1951	36	64	1.77
January 21-27, 1951	4½	4	.88
January 28-February 3, 1951 (week of storm)	15½	26	1.67
February 4-10, 1951	27½	21	.76
Total	166½	145	.87

Table 2.--Woodcock Census Winter 1949-50

Date	Hours afield	Number woodcock	Woodcock per hour
December 4-10, 1949	4½	6	1.33
December 11-17	9	8	.88
December 18-24	12	9	.75
December 25-31	3	4	1.33
January 1-7, 1950	6½	11	1.69
January 8-14	16½	12	.72
January 15-21	14	17	1.21
January 22-28	48	19	.39
January 29-February 4	5	4	.80
February 5-7	11	27	2.45
Total	129½	117	.9

Table 3

<u>Winter</u>	<u>Census hours</u>	<u>Birds per hour</u>
1946-47	10 (est.)	$\frac{1}{2}$
1947-48	20	1
1948-49	8	5
1949-50	129 $\frac{1}{2}$	1 (approx.)
1950-51	166 $\frac{1}{2}$	1 (approx.)

### Migration

The first fall woodcock observations were made on the Red Dirt Game Management Preserve, Natchitoches Parish, La. On October 22, 1950, Carmen Beasley (Refuge Manager) saw two birds on the Bayou L'lvorgne bottom. A single woodcock was observed by V. H. Reid on the Bayou Luce bottom on October 25, 1950. This observation was also made on the Red Dirt Game Management Preserve.

In comparing the weekly figures for the winters 1949-50 and 1950-51, Table 2 shows a woodcock point for every .5 hours (30 minutes) during the week of January 1-7, 1950. A comparable count (1 point per .5 hours, Table 1) was made the week of January 14-20, 1951. This puts the principal woodcock influx in this territory for the winter of 1950-51, one week later than in the winter of 1949-50.

In this connection, the woodcock coverts at Alco, Louisiana were visited on the afternoon of January 14, 1951. Three woodcock were flushed. Very little woodcock signs (probings and droppings) were noted on this round. The same census round was made the following morning (January 15, 1951); 14 woodcock were tallied. Woodcock signs were numerous. Where probings and droppings were lacking on January 14, they were numerous on January 15, 1951. There had been a movement of birds into the Alco territory during the night.

The census figures (Table 1) indicate another influx of birds in this territory during January 28 and February 3. During this period a bird was flushed for every .6 hour (36 minutes) spent afield. Table 2 indicates a similar influx of birds between February 5-7, 1950, when a woodcock was tallied for every .4 hours (24 minutes) of censusing. These figures are indicative of a movement of birds into this territory about the same period for both years.

### Sex Ratio

Thirty-seven woodcock were collected during the winter. Eighteen of the birds were males and 19 were females.

## Weights

Weights and measurements were taken on all of the birds collected the past two winters. The female woodcock weights in 1949-50 ranged from 140 to 220, averaging 191.9 grams; for the winter 1950-51 they ranged from 178 to 212, averaging 193.6 grams. Males ranged from 132 to 180, averaging 155.1 grams in 1949-50 and from 130 to 180, averaging 158.5 grams in 1950-51.

Apparently woodcock average lighter while on their southern wintering grounds than while they are in the North judging from a comparison of the above weights with figures obtained by Mendall and Aldous ("The Ecology and Management of the American Woodcock," 1943). The weights of 80 males examined by Mendall and Aldous averaged 175.8 grams. The average weight for 111 females was 215 grams. Thus weights of males on the wintering grounds averaged 18.6 grams lighter, and females 22.2 grams lighter than birds weighed in the north. Two male woodcock collected after the storm weighed 125 and 146 grams. Thus, one of the birds collected after the storm was lighter than the lightest bird collected before the storm and the average weight of both birds was below the average weight of the males collected before the storm; this despite the fact that their linear measurements were greater than those of the lightest male collected before the storm. The information indicates that the two males were down in weight as a result of the subfreezing weather.

## Ice Storm of January 30-February 3, 1951

In the Leesville vicinity, a heavy rain on January 29 was followed by subfreezing temperatures during the night. Rain, sleet and snow followed on January 30. This was followed by  $4\frac{1}{2}$  consecutive days of subfreezing temperatures. The temperature went as low as 7 degrees above zero on the morning of February 2. The subfreezing weather abated on Sunday, February 4, 1951.

The ground was frozen and covered with ice and snow. Trees, shrubs and ground vegetation were covered with ice and snow. Small streams, branches and ponds were frozen over tightly. Larger streams and ponds remained open.

On February 2, 1951,  $2\frac{1}{2}$  hours were spent with two dogs in working some small stream and branch bottoms for woodcock. No birds were found. This was done in the vicinity of Leesville, La. The ground was still snow and ice-covered except for some of the south slope exposures. In these situations the snow and ice were slowly melting.

On February 3, 1951, 3 hours were spent with dogs in the woodcock coverts at Alco, La. The same round was made that was mentioned earlier in the report. On the January 15th census, 14 woodcock were found. On the February 3rd round, 10 birds were flushed. These figures yield about the same woodcock population for the area during the storm as before the storm.

Prior to the storm the woodcock were found on the blackjack-postoak hillsides surrounding Alco pond. They were also found in bottomlands. Alco pond is an estimated 25 acres in size. The pond and the seepy ground around its shoreline did not freeze. During the subfreezing temperature the birds were flushed from the brushy thickets bordering the pond and from the brush and pine cover of branch bottom near the pond. The blackjack-postoak hillsides that were utilized by woodcock were now snow and ice-covered.

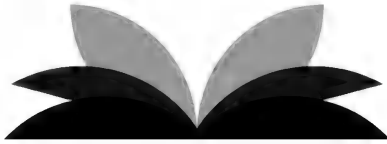
From these observations it is believed that the woodcock inhabiting the smaller stream and branch bottoms that froze over tightly were forced to move to more favorable locations during the storm. The birds that were inhabiting larger stream bottoms and ponds that did not freeze tightly weathered the subfreezing temperatures in those locations.

No dead woodcock were found during or after the freeze. One meadow-lark which had one foot frozen off was found. One dead cardinal was found in the snow. The remains of what was cursorily recognized as a Pine-woods Sparrow was found while searching woodcock coverts.

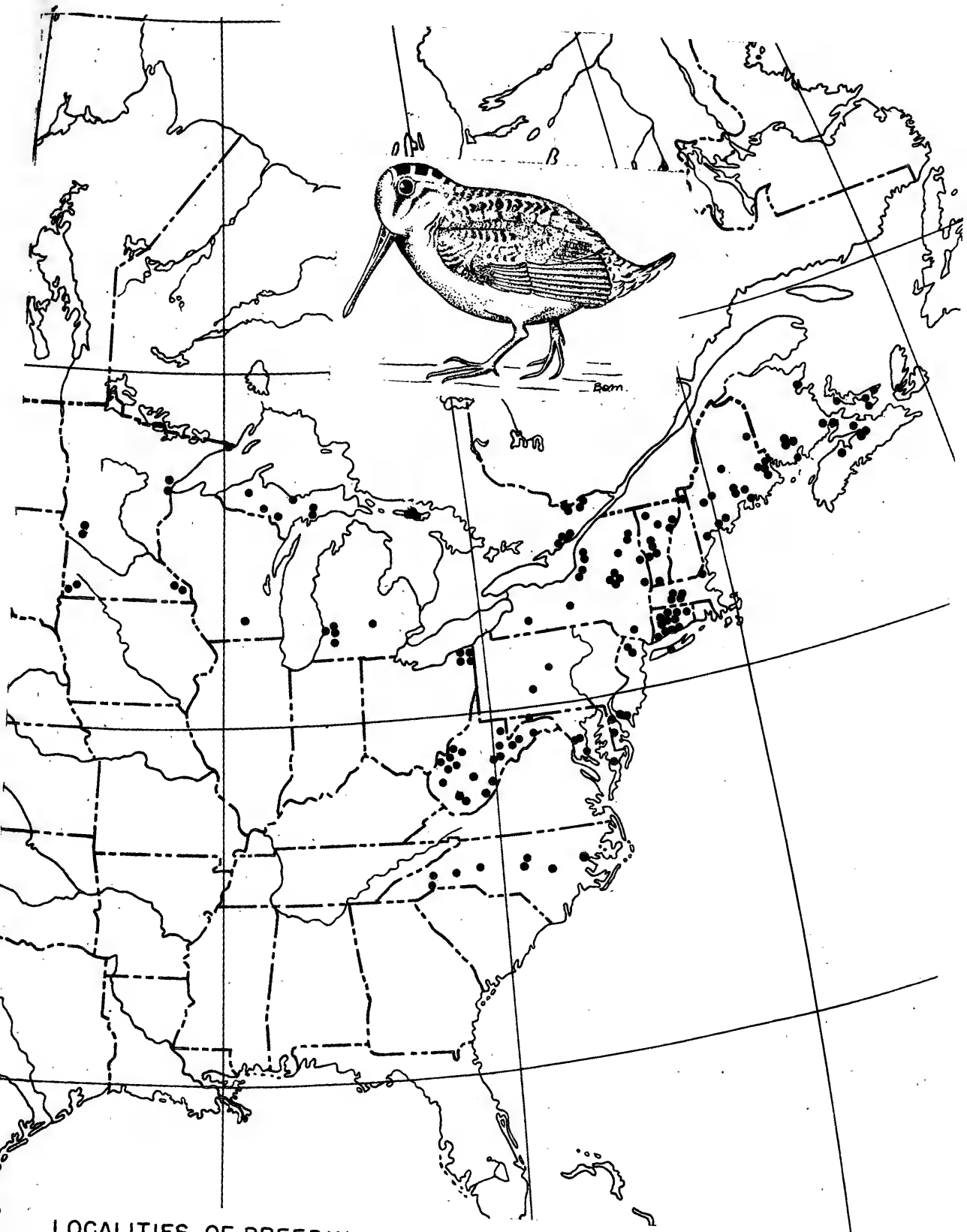
Reference is made to the data for the week January 28 to February 3, 1951 (storm week) in Table 1. The data show a woodcock point for every .6 hours (36 minutes) spent afield for this period. In the table (1) this figure is bested only by the week of January 14-20, when a bird was found for every .5 hours spent afield. The data show about as many woodcock in the area during this critical period as before the freeze.

In conclusion, the observations indicate that the woodcock managed to survive the subfreezing temperatures in this territory without serious mortality. Evidence indicates, however, that the birds may have suffered a loss of weight during this period.

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LOCALITIES OF BREEDING GROUND COUNTS OF WOODCOCK - 1951



## WOODCOCK SINGING COUNTS--EASTERN CANADA, 1951

Victor E. F. Solman

### Canadian Wildlife Service

Spring counts of male woodcock occupying singing grounds have been made in eastern Canada for several years between the dates April 15-20 and May 15-20. During 1951 such counts were made in areas in Ontario, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island.

The counts were made by reliable observers, including officers of the Canadian Wildlife Service, the Wildlife Management Institute, members of the Royal Canadian Mounted Police, officers of Provincial Game Departments, and interested private citizens who cooperated on a voluntary basis.

The relation between the number of singing male woodcock in an area and the breeding woodcock population of the area is not known. In the absence of a more reliable index, comparable annual counts of singing male woodcock are considered to indicate trends in the woodcock populations in the areas concerned.

#### Ontario

The number of singing male woodcock in the Ottawa area for 1951 appeared unchanged from 1950 and was slightly above the long-term average. The Kingston area recorded a marked reduction, while the Manitoulin Island area recorded a small increase. The Provincial total number of singing males recorded on check areas was 63 as compared with 53 in 1950 and a several-year average of 58.3 for the same areas.

#### Quebec

No information of a comparative nature is available, since the studies were begun in this Province with the 1951 counts. Four areas were selected which were occupied by singing male woodcock, and useful information regarding trends should be available in 1952.

#### Nova Scotia

Weather conditions in Nova Scotia in 1951 were favorable for woodcock nesting in contrast to the damaging late spring snow of 1950. The number of singing male woodcock has not recovered from the 1950 setback, as shown by the fact that the 1951 total number is 57 as compared with 58 in 1950 on the same five areas. The several-year average for these areas is 61.1. The three areas for which data covering 11 years are available show a total number of only 40 male birds, as compared with 46 in 1950 and an 11-year average of 46.6.

### Prince Edward Island

Weather conditions were reported as favorable for woodcock nesting. The number of singing male birds on the four study areas was 41 as compared with 44 in 1950 and a long-term average of 44.8.

### New Brunswick

Weather conditions in New Brunswick were favorable for woodcock nesting and the numbers of male birds appear to have recovered well from the 1950 reduction, since the 1951 total for the eight areas studied was 143 male birds in contrast to 105 for the same areas in 1950. The several-year average for the areas was 143.1.

The following table provides data on numbers of singing male woodcock recorded on check areas in five Provinces. For four Provinces, data from previous years are available for comparison.

### Summary

The numbers of singing male woodcock in Ontario and New Brunswick have shown increases of about 12 and 14 percent, respectively, as compared with 1950 conditions, and have returned to conditions represented by averages covering 2 to 11 years.

In Nova Scotia and Prince Edward Island, numbers of singing male woodcock are little changed from 1950 and are still about 11 percent below the long-term averages for the areas reported upon.

# Woodcock Singing Counts, 1951

Province	Census area	Numbers of Occupied Singing Grounds			No. of years	Observer 1951
		1950	1951	Average		
Ontario	Ottawa (Stittsville)	9	10	7.3	9	R.D. Harris & V.E.F. Solman
	Ottawa (Carp)	5	6	4.2	6	" "
	Ottawa (Vars)	8	7	8.6	9	" "
	Ottawa (Cumberland)	2	1	2.0	9	" "
	Kingston (Cataraqui)	1	0	0.7	3	G. M. Stirrett
	Kingston (Westbrook)	6	2	4.3	3	" "
	Kingston (Perth Road)	1	1	1.2	3	" "
	Kingston (Holleford)	4	5	3.7	3	" "
	Manitoulin Island (East Bluff West)	1	1	2.3	3	H. G. Lumsden
	Manitoulin Island (Indian Point)	1	9	5.3	3	" "
	Manitoulin Island (East Bluff Trail)	4	8	7.3	3	" "
	Manitoulin Island (East Bluff Road)	2	8	4.3	3	" "
	Manitoulin Island (East Bluff beaver meadow road)	3	4	3.7	3	" "
	Manitoulin Island (Gore Bay hill)	6	3	3.0	3	" "
Quebec	Marieville	-	2	2	1	L. Lemieux
	Chambly	-	1	1	1	"
	Mount Royal Cemetery	-	2	2	1	"
	LaSalle woods	-	11	11	1	"

Province	Census area	Numbers of Occupied Singing Grounds			No. of years	Observer 1951
		1950	1951	Average		
Nova Scotia	Wolfville (Area #1)	12	10	14.4	11	R. W. Tufts
	Wolfville (Area #2)	20	18	18.8	11	"
	Wolfville (Area #3)	14	12	13.4	11	"
	Truro (New Annan Rd.)	8	12	10	2	H. R. Webster
	Truro (Camden Road)	4	5	4.5	2	"
	Wentworth (Wentworth Rd.)	-	17	17	1	"
	Baddeck, C. B. (Baddeck-Middle R. Road)	-	10	10	1	"
Prince Edward Island	Fortune	15	14	11.4	11	A. M. Johnston and S.C. Jenkins
	Avondale	10	9	10.0	4	"
	French Village	10	4	9.2	11	"
	Conway	9	14	14.2	11	"
New Brunswick	Fredericton (Richibucto Road)	17	26	22.1	11	B. S. Wright
	Fredericton (Richibucto New area)	-	49	49.1	1	"
	Fredericton (Kingsley Bridge)	13	15	13.8	11	"
	Fredericton (Charter's Settlement)	13	19	13.6	11	"
	Sackville (Rockeport Road)	4	12	12.7	3	H. R. Webster
	St. John (Tilley Road)	15	21	29.2	4	"
	Moncton (Turtle Creek)	34	27	38.5	4	J. Mayer and H. R. Webster
	Tabusintac (Price Settle- ment Road)	9	23	13.2	11	H. R. Webster

## WOODCOCK CENSUS STUDIES IN NORTHEASTERN UNITED STATES, 1951

Howard L. Mendall  
Maine Cooperative Wildlife Research Unit

During the spring of 1951, as in previous seasons, the writer served as coordinator of the woodcock census studies carried out in the northeastern states.

For 15 consecutive years the personnel of the Maine Cooperative Wildlife Research Unit has conducted censuses in central and eastern Maine. Although the 1951 studies were under the general direction of Malcolm Coulter and the writer, considerable assistance was given on part of the central Maine areas by the wildlife graduate students of the University of Maine, and on all of the Washington County areas by John M. Dudley.

In 1945, a number of new census areas were established throughout the New England states and New York by cooperators who reported their findings to the Maine Unit for combined tabulations. Each year since then, the number of these cooperator areas has steadily increased and now excellent coverage is being obtained throughout this general region. With the addition, this spring, of several new areas in New Hampshire, Vermont, Connecticut, and New York (these data will be available for comparison in 1952), we are now in a position to determine woodcock populations more accurately than ever before.

State organization of the cooperator areas has been as follows: for Maine, Howard Mendall, Maine Cooperative Wildlife Research Unit; for New Hampshire, Hilbert Siegler and Fred Scott, New Hampshire Fish and Game Department; for the Franklin County area in Vermont, Ralph Minns, U. S. Fish and Wildlife Service; for all other areas in Vermont, Roger Seamans, Vermont Fish and Game Service; for the Newburyport area in Massachusetts, Russell Norris, U. S. Fish and Wildlife Service; for all other areas in Massachusetts, William Sheldon, Massachusetts Cooperative Wildlife Research Unit; for Connecticut, James Bishop, Connecticut Board of Fisheries and Game; for Long Island, Samuel Miller, U. S. Fish and Wildlife Service; for all other areas in New York, Charles Brown, New York Conservation Commission.

The results of the 1951 census studies are given in Table 1. When available, data are included for four years for added interest.

Table 1.--Woodcock Census Studies in Northeastern States, 1951

State	Census Area	County	No. Occupied Singing Grounds				Observer in 1951
			1948	1949	1950	1951	
Me.	Calais and vicinity	Washington	71	63	62	63	H. Mendall
Me.	Edmunds	Washington	28	24	23	21	A. Davis
Me.	Alexander	Washington	7	9	10	5	J. Dudley
Me.	Cooper	Washington	14	17	18	11	H. Mendall
Me.	Houlton	Aroostook	9	7	10	9	H. Mendall
Me.	Amherst	Hancock			15	8	M. Coulter
Me.	Lamoine	Hancock	5	6	8	5	C. Barrett
Me.	T4 R10	Piscataquis	8	6	9	11	H. Taylor
Me.	Orono	Penobscot	6	1	3	4	M. Coulter
Me.	Alton	Penobscot	9	8	7	8	M. Coulter
Me.	Lexington	Somerset	8	9	12	7	E. Winter
Me.	Salem	Franklin	12	11	14	14	E. Winter
Me.	Togus Pond	Kennebec	4	2	3	5	D. Dorr
Me.	Gardiner	Kennebec	6	8	10	12	W. Harris
Me.	Cumberland	Cumberland	4	4	4	2	L. Brackett
N. H.	Pittsburg	Coos	8	12	11	12	F. Scott
Vt.	Highgate	Franklin	7	6	9	8	R. Minns
Vt.	Victory #1						
	Moose River	Essex	22	21	24	18	R. Seamans
Vt.	Victory #2	Essex		6	4	8	R. Seamans
Vt.	Waterford	Essex	11	13	12	9	R. Seamans
Vt.	Marshfield	Washington	6	5	4	4	R. Seamans
Vt.	Wheelerville	Rutland	12	17	13	6	H. Colton
Vt.	Shrewsbury	Rutland	12	16	4	12	H. Colton
Vt.	Sherburne	Rutland	3	4	2	6	H. Colton
Vt.	Ripton	Addison	16	16	14	15	H. Colton
Vt.	Halifax	Windham	6	6	5	9	R. Seamans
Mass.	Newburyport	Essex	14	18	24	23	R. Norris
Mass.	Prescott	Worcester			75	80	W. Sheldon
	Peninsula						
Mass.	Leverett	Franklin		18	15	14	W. Sheldon
Mass.	Shutesbury	Franklin		13	15	14	W. Sheldon
Conn.	Canaan	Litchfield			6	4	W. Sondrini
Conn.	Litchfield	Litchfield	5	8	8	5	R. Billard
Conn.	E. Hartland	Litchfield					
		and Hartford	0	3	1	3	A. Lamson
Conn.	Glastonbury I	Hartford	2	4	4	4	M. Belden
Conn.	Glastonbury II	Hartford	4	5	5	4	M. Belden
Conn.	Branford I	New Haven	5	4	2	2	O. Beckley
Conn.	Branford II	New Haven	3	2	1	1	O. Beckley
Conn.	Guilford	New Haven	7	4	6	4	O. Beckley

State	Census Area	County	No. Occupied Singing Grounds				Observer in 1951
			1948	1949	1950	1951	
Conn.	Eastford	Windham	4	6	5	4	F. McCamey
Conn.	Shenepsit II	Tolland	4	6	4	2	M. Belden
Conn.	Shenepsit III	Tolland	1	3	1	1	M. Belden
Conn.	Portland I	Middlesex	3	4	1	3	M. Arnold
Conn.	Portland II	Middlesex	7	4	6	4	M. Arnold
Conn.	Norwalk	Fairfield			5	4	R. Billard
N. Y.	Brookhaven, L.I.	Suffolk	1	3	1	1	S. Miller
N. Y.	New Hudson	Allegheny	3	8	6	4	J. Wunder
N. Y.	Bethlehem	Albany	7	6	8	10	R. Smith
N. Y.	Westerlo	Albany	6	6	9	10	R. Carl
N. Y.	Guilderland - Knox	Albany	7	5	4	9	R. Carl
N. Y.	Partridge Run	Albany			3	6	C. Brown
N. Y.	Bucks Corner	Rensselaer		4	8	5	R. Smith
N. Y.	Mamakating	Sullivan	4	2	3	2	W. Riordan
N. Y.	Watertown- Adams	Jefferson	4	3	6	6	F. Morrell
N. Y.	Rodman	Jefferson	1	2	3	3	S. Northrup
N. Y.	Connecticut Hill	Tompkins		32	30	32	O. Hewitt
N. Y.	Indian Lake	Hamilton	8	13	15	12	C. Brown
N. Y.	Lysander	Onondaga	18	23	17	9	W. Dence
N. Y.	Wilmington	Essex	9	9	10	14	G. Chase
N. Y.	Schroon Lake	Essex			4	2	C. Stowell
N. Y.	Redfield	Oswego			5	4	C. Brown
N. Y.	New Britain	Columbia			2	4	R. Darrow
Totals				628	601	4% decrease	

### Summary

The following tabulation shows, in condensed form, the totals by states on all census areas:

State	1950 Total	1951 Total	Number of Counts
Maine	208	185	15
New Hampshire	11	12	1
Vermont	91	95	10
Massachusetts	129	131	4
Connecticut	55	45	14
New York	134	133	17
Grand Total	628	601	61

From the data it may be seen that the status of breeding woodcock in northeastern United States showed a slight decrease this spring in comparison with 1950. Since the decrease amounted to only 4 percent, it does not appear to present any very serious problems, especially in view of the favorable status of the species for the three years prior to 1951. This year's over-all decrease resulted largely from losses in Maine and Connecticut.

Several interesting points were noted in an examination of the individual census data sheets and in correspondence with various co-operators. Local fluctuations always occur, but this year the changes were much more pronounced. A large number of areas showed either marked increases or heavy decreases. These abrupt changes were observed especially in Maine, Vermont, and New York.

Another fact mentioned by a number of cooperators, and observed to a surprising degree by the writer in eastern Maine, was a very unusual tendency by male birds for changing territories during the height of the breeding season. Such shifting of singing grounds, observed on repeat checks, greatly complicated the evaluation of the census data. This always occurs to a limited extent but in 1951 it was observed rather frequently on some areas. This easily could have accounted for a sampling error as large or larger than the 4 percent decrease recorded.



WOODCOCK CENSUS STUDIES IN DELAWARE, MARYLAND, NORTH CAROLINA,  
NEW JERSEY, PENNSYLVANIA, WEST VIRGINIA, AND OHIO, 1951

P. F. English  
Pennsylvania Cooperative Wildlife Research Unit

In 1939 the Pennsylvania Cooperative Wildlife Research Unit initiated singing-ground counts on woodcock and have continued these counts annually on two permanent census areas in central Pennsylvania.

At the North American Wildlife Conference held March 1949 at Washington, D. C., Fish and Wildlife Service personnel asked P. F. English to enlist other mid-Atlantic states in procuring annual census counts for their areas.

Reports were submitted for these states in 1950 and this compiled report was submitted to U. S. Fish and Wildlife Service. These results along with similar findings for the New England states aid the Fish and Wildlife Service in setting seasons that will be advantageous to the sportsmen and insure perpetuation of the species. The states cooperating in 1950 and 1951 are:

Board of Game and Fish Commissioners, Dover, Delaware.  
Game and Inland Fish Commission, Baltimore 2, Maryland.  
Wildlife Resources Commission, Raleigh, North Carolina.  
Department of Conservation and Economic Development, Trenton 7,  
New Jersey.  
Pennsylvania Cooperative Wildlife Research Unit, State College,  
Pennsylvania.  
Conservation Commission, Charleston, West Virginia.

These states have been asked to set up permanent census areas which may be checked year after year. Only by such a method may the woodcock population trends be obtained.

The findings for 1951 and for 1950 are given in Table 1. The results of both years are presented so the cooperating states may compare the two years findings. One cooperator in Ohio has submitted data used in the 1951 report.

Table 1.--Woodcock Census Areas Maintained by Cooperators. Report for 1950 and 1951. (Includes new areas established in 1951)

State	Census Area	County	No. Occupied Singing Grounds			Observer in 1951
			1949	1950	1951	
Del.	Petersburg	Kent	9	6		E. B. Chamberlain
Del.	Gotts Road	New Castle	7	5		H. Cafer and R. Beck
Md.	15 mile Creek Road	Allegany	3	5		D. H. Arner and H. L. Roberts
Md.	Pocomoke River	Worcester		3		G. A. Jones and R. Kenney
Md.	Patuxent Road	Anne Arundel		3		C. H. Milton, Jr.
Md.	Drum Point	Calvert		1		J. R. Longwell
N. C.	Loray	Iredell	1	0		T. R. Mitchell
N. C.	1 mi. west of Raleigh	Wake	3	0		Donald G. Allison
N. C.	Conohoe Farm	Martin	1	9		Ben H. James
N. C.	New Hope Farm	Chatham		4		D. C. Thornton
N. C.	Oakwood Drive	Orange		2		D. C. Thornton
N. C.	Highway 70 Glen Alpine	Burke		2		R. B. Hazel
N. C.	Glen Alpine to Power Plant	Burke		4		R. B. Hazel
N. C.	Morganton back yard	Burke		2		R. B. Hazel
N. C.	1 mi. east Morganton	Burke		4		R. B. Hazel
N. C.	Route 191 S. Bent Cr.	Buncombe		3		F. B. Barick
N. C.	Tracy Grove Road	Henderson		4		Rex L. Bird
N. C.	Old N. Main St. at R.R.	Henderson		5		Rex L. Bird
N. J.	Tuckahoe Area	Atlantic	3	3	7	F. V. Schmidt
N. J.	Back Rd. Flat Brook tract	Sussex		7		R. A. Spinks
N. J.	Walpack - Bevans	Sussex		6		R. A. Spinks
N. J.	Haleyville Shooting grounds	Cumberland		7	7	E. G. Bevan
Pa.	Barrens	Centre	16	16	3	W. M. Sharp and P. F. English
Pa.	Stone Valley	Huntingdon	15	15	6	W. M. Sharp and P. F. English
W. Va.	Rt. 47 to Md. border	Preston		1	0	W. Santonas
W. Va.	Leading Creek	Randolph	5	4	2	H. and K. Chiavetta
W. Va.	Kumbrabow Forest	Randolph	9	9	10	H. G. Uhlig
W. Va.	State Rt. 32	Tucker	4	6	4	W. R., Eliz. DeGarmo and Hans Uhlig
W. Va.	2 mi. S. of Bayard	Grant		5	9	Gilpin and Gilpin

State	Census Area	County	No. Occupied Singing Grounds			Observer in 1951
			1949	1950	1951	
W. Va.	2 mi. N. of Henry	Grant		5	4	Kletzly and Wingard
W. Va.	Clawson	Pocahontas		10	4	Bailey and Holderby
W. Va.	Phillips Run	Nicholas		4	1	C. Smithson
W. Va.	Cockran Mill to Grandview	Raleigh		1	0	T. R. Samsell
W. Va.	Mt. Tabor Road	Raleigh		1	6	T. R. Samsell
W. Va.	Harvey's Creek	Lincoln			0	L. E. Alderson
W. Va.	Rt. 45/5 south	Hampshire			6	R. G. and V. J. Wingard
W. Va.	Co. Rt. 25 to U. S. 60	Greenbrier			1	E. H. and G. Willard
W. Va.	Co. Rt. 12 to Hemlock	Jackson			0	J. E. Beach
W. Va.	Co. Rt. 34/1 and 5/12 to U.S. 33	Jackson			0	J. E. Beach and H. J. Moore
W. Va.	Sugar Run to Willow Grove	Jackson			0	J. E. Beach
W. Va.	Co. Rt. 18 to Rt. 2	Jackson			0	J. E. Beach and H. J. Moore
W. Va.	Old Town Co. Rd. to Igloo	Mason			6	H. Dahl and A. Dahl
Ohio	Route #1--Austin- burg	Ashtabula			7	M. C. and M. D. Gilfillan
Ohio	Route #2--Dorset	Ashtabula			6	M. C. and M. D. Gilfillan and Harry Andrews
Ohio	Route #3--Morgan	Ashtabula			5	M. C. and M. D. Gilfillan
Ohio	Route #4--Andover	Ashtabula			10	M. C. Gilfillan
Totals 1950-1951				111	88	20.7% decrease

Table 2

This tabulation compares by states data for 1950 and 1951, it does not include new areas as there is nothing to compare.

<u>State</u>	<u>1950 Count</u>	<u>1951 Count</u>	<u>Number of Counts</u>
Delaware	16	11	2
Maryland	3	5	4
North Carolina	5	9	12
New Jersey	10	14	4
Pennsylvania	31	9	2
West Virginia	46	40	18
Grand Total	111	88	42

From the data presented it is evident that the woodcock breeding in the area covered by this report show a 20.7 percent decrease in 1951 over that in 1950. The highest losses are for Pennsylvania and West Virginia.

# WOODCOCK BREEDING GROUND STUDIES IN THE CENTRAL NORTHERN STATES IN 1951

John W. Aldrich

U. S. Fish and Wildlife Service

Very gratifying has been the response of woodcock observers in the central northern states this year, the first time we have attempted a cooperative effort to obtain information on woodcock abundance there. Next year further efforts will be made to obtain increased coverage in that region and it is hoped that counts will be repeated on all the routes followed this year, in addition to new routes. Counts made in Michigan were largely the result of the cooperation of the State Game Department.

The accompanying table contains a summary of all of the counts from the central northern states, which will be satisfactory for use as a basis for comparison with results obtained next year. It should be emphasized that if these counts reported this year are to have any value they must be repeated next year under as nearly as possible comparable conditions so that they will be a true index to any change in status of woodcock. It will be noted that the numbers of singing grounds which were estimated from observers reports have been converted into singing grounds per 10 miles, so that the numbers recorded on routes of various lengths will be comparable.

The number of singing grounds per route were estimated as accurately as possible based on the best information we have on woodcock behavior on their singing grounds. On the basis of Sheldon's banding experiments (see his report) it is believed that reliable results require more than three trips several days apart. Also, it is now felt that in areas as far north as southern Michigan counts made in April are too early to obtain reliable results. Therefore, observers should try to start their first count no earlier than the first of May.

Woodcock singing ground counts in central northern states for 1951

State	Locality	County	Singing grounds per 10 miles		Observer in 1951
Minn.	Shetek State Park	Murray	5		G. T. Bue
"	Weaver	Wabasha	1		W. H. Langley
"	Baldy Creek Road	Cook	17		M. H. Stenlund
"	Glenwood, Route 1	Pope	0		Robert Benson
"	Glenwood, Route 2	Pope	0		Robert Benson
"					P. B. Hopslund
"	Duluth	St. Louis	29		J. K. Bronoel
Mich.	Wright's Camp	Alger	41		W. D. Burnett
"	S. of Stutts Creek	Schoolcraft	55		Theodore Fairbanks
"	SE of Anderson Creek	Schoolcraft	47		Theodore Fairbanks
"	T4 3N R29W	Dickinson	30		Ivan Thomson
"	Crystal Falls	Iron	35		Ivan Thomson
"	R. 1, Laingsburg	Clinton and Shiawassee	10		Harold Jameson
"	Alamo	Kalamazoo	27		Mrs. Gladys Hall
"	Almena	Van Buren	39		Mrs. Gladys Hall
"	Sidnaw	Houghton	23		R. R. Rafferty
"	Round Lake and M-89	Allegan	15		O. L. Haugen
"	M-89 Gable's Corners	"	25		O. L. Haugen
"	2 mi. SE of New Richmond	"	19		O. L. Haugen

Area Studies

		Singing grounds per 100 acres		
		1950	1951	
Minn.	Cloquet	Carlton	2.5 2.2	W. H. Marshall
Wis.	Madison	Dane	1.5 1.8	R. A. McCabe

CENSUS OF WOODCOCK BREEDING POPULATION  
IN VICINITY OF PATUXENT REFUGE, MD. IN 1951

Robert E. Stewart

U. S. Fish and Wildlife Service

Evening counts of singing male woodcock were made from March 6 to April 4, 1951.

The study area was approximately a 16.5 square mile rectangle, between Bowie and Laurel, Maryland, and including Patuxent Research Refuge.

The population of territorial males was 43 (2.2 per sq. mile), the density varying greatly from one portion of the area to another, depending on habitat conditions. Typical habitat was damp bushy areas that have resulted from cutting and burning of upland forest, where moisture results from seepage. The cover is composed chiefly of deciduous tree species such as sweetgum and red maple. Woodcock occurred regularly also in brushy secondary stages of succession on damp upland areas that have been retired from agriculture and grown up to Virginia pine or sweetgum brush. This habitat is not so dense as the preceding type. The population in one 2-square mile area of damp brush (cut-over and burned forest land) was 19 territorial males (1.5 males per 100 acres). These were probably optimum woodcock breeding conditions for the inner coastal plain of Maryland, and makes an interesting comparison with the 1.5 and 2.2 singing grounds per 100 acres reported for southern Wisconsin and northeastern Minnesota respectively (see report for central-northern states).

Much of the woodcock habitat on the Patuxent Refuge has been destroyed in recent years. This is largely the result of clearing in connection with farm wildlife experiments, but partly also from natural succession.

The refuge population of territorial males was determined during 4 years as follows: 1942 - 25; 1943 - 21; 1947 - 8; 1951 - 9. The noticeable drop between 1943 and 1947 was probably almost entirely due to the habitat changes mentioned above.

# STUDIES ON BREEDING WOODCOCK IN MASSACHUSETTS

William G. Sheldon

Massachusetts Cooperative Wildlife Research Unit

## Introduction

Beginning in the spring of 1949 personnel of the Massachusetts Cooperative Wildlife Research Unit began intensive studies of woodcock on their breeding grounds in central Massachusetts. Student and outside cooperators during the spring of 1951 included E. Howard, J. Baird, R. C. Wood, D. T. Ford, Gordon Hobart, Gardiner Hobart, F. J. Wojcik, R. T. Norris, and F. Scott. This is a progress report with insufficient data to support any definite conclusions.

## Objectives

The long range objectives of these studies include banding, behavior and movements of singing males, state populations, detailed ecological studies of state habitat, migrations, and such life history data as can be gathered.

## Methods

Data included in the following report is based largely on the results of trapping singing males with the Unit automatic decoy-trap. Details on the construction and trapping techniques are available in mimeograph form from the Unit. Traps were set on singing grounds from late March to May 25 without interruption.

## Spring Migration

The earliest woodcock arrivals in the Amherst region were confined to the lower reaches of the Connecticut Valley. One banded woodcock picked up dead in Fall River, Mass., on March 3, had been banded on January 5 of this year in Louisiana. Observers nearer the coast sent records which indicated the migration was a few days earlier in that region. The height of the early spring migration in the Amherst area was April 8-10. Regular spring censuses and trapping results indicated a later influx of birds in early May, a phenomenon which will be discussed in a later paragraph of this report.



## Annual Massachusetts Census

For purposes of getting comparative data, counts were made outside the Quabbin reservation as well as counting the singing grounds on Prescott peninsula. The great majority of the birds on the 80 singing grounds on Prescott were trapped and banded. Most of the birds recorded were heard several evenings over a period of about three weeks. The results showed no significant change in the population during the last year. The totals were:

<u>1950</u>	<u>1951</u>
129	131

These included 23 birds tabulated by R. Norris in the Newburyport area in Essex County where many counts were made.

### Trapping and Banding Success

Ten juveniles were banded from 4 broods found with a dog.

One hundred and fifty-four individual birds were captured. These included 3 birds banded in 1949 and 15 birds banded in the spring of 1950. Only two of these were females. One hundred and thirty-four new adult males were banded.

Including all repeats of this year 183 captures were made.

Accurate records on 100 birds captured gave a trap success figure of 31 percent based on 314 trap-nights. Sixty-three sites where birds were captured in April on Prescott peninsula were retrapped late in May. Since traps were left a maximum of two nights, and there was no time to ascertain if birds still were using sites, these results are not included in the calculations on success.

There was a minimum of 20 trap failures. In 24 instances traps were sprung by rain, wind or animals.

Of 157 sites trapped by Unit personnel, 128 birds were captured.

### Homing Instincts and Movements as Indicated by Trap Returns

Five woodcocks were captured and banded in the spring of 1949. One of these birds was originally caught at another male's singing ground, and since his home site was never located, the chances of ever recapturing him were slight. Three of these five woodcocks were recaptured this year. Two were on precisely the same singing sites and the third was using another corner of the field where he was captured in 1949. In 1950, one of these birds (50-345302) was caught in its same site but #50-345304 used a singing ground 600 yards away from his original capture site. Another bird was using his 1949 site. This spring he had successfully reclaimed his original singing ground. Of most interest is the history of #50-345309. In 1949 he was released 8 miles away from his capture site. In 1950 his singing ground which is isolated was checked several times. Another bird was caught on the opposite side of the field and was the only bird using the area. Other fields along the same wooded valley all yielded birds but the 1949 bird was not recaptured. Presumably he must have been in the vicinity, since he was caught this year in his original field. In this instance the bird never used his original singing spot but was caught where the 1950 bird was captured, about 100 yards away from the 1949 capture site.

These observations were further supplemented by returns on 15 birds banded in 1950 and recaptured this spring. Five were taken on their 1950 capture sites. One was initially taken on a new site but later recaptured on the site he occupied in 1950. Other singing males occupied 7 of the sites where the remaining 9 birds had been captured in 1950. Two of the 1950 capture sites were not used. Three of these 9 birds used new sites where no males were heard a year ago. The other 6 used 1950 capture sites which were used by different birds last year. In general all recaptured birds returned to the same vicinity where taken a year ago. An exceptional case was #50-301846 recaptured 5 miles north of his 1950 capture site, from which a new bird was taken this year.

Data on the 18 recaptures of birds banded in 1949 and 1950 are presented in Table 1.

In addition to these records there were 21 birds caught originally this spring and recaptured as repeats one or more times this year. Table 2 summarizes this information.

Besides the data presented in Tables 1 and 2 additional information given by retrapping should be considered. Sixty-three sites which yielded birds in April on Prescott Peninsula in Quabbin Reservation were retrapped after May 15. Twenty-five birds were captured. As indicated in Tables 1 and 2, 9 of these birds had not changed singing grounds and 6 had moved. The tables do not bring out the fact that 8 new birds were caught on sites occupied by other birds in April. Two additional unbanded birds were captured on sites unoccupied in April. This indicates movement--whether migratory or not is problematical as will be discussed in a later section.

Based on the evidence to date it seems clear that most adult male woodcocks return to the vicinity of their breeding sites of previous years. Competition is undoubtedly a factor in causing a change of singing ground although there were two instances where birds failed to re-occupy a singing ground used a previous year in spite of the fact no other bird was using it. The case of bird #50-345304, caught 3 years in succession, suggests that a male may occupy a new singing ground a second year if driven from his original site but may successfully reclaim the latter a year later. During early April when some resident birds have arrived and other migratory birds are passing through it is logical to expect a good deal of jockeying around of males competing for singing grounds. The assumption of many observers is that once a male becomes established he remains at his singing site throughout the breeding season. Trapping returns in 1950 and this spring demonstrate that males still visit neighboring singing grounds late in the breeding season and frequently occupy different territories than those used consistently in mid-April during what is regarded as the height of the breeding season.

Table 1.--Recaptures and movements of woodcocks banded in 1949 and 1950

Number Series	Date first captured	Number of sites on which captured	Date last captured	Greatest distance moved from original capture site	Remarks
345302	4/16/49	1	4/20/51	0	Captured on same site 3 years in succession.
345304	4/26/49	2	4/24/51	600 yds.	Captured on different site in 1950 and original site in 1951.
345309	5/18/49	1	4/29/51	0	Not found in 1950. In 1951 using another part of field than capture site of 1949. Another bird used site in 1950.
301818	4/2/50	1	3/30/51	0	Also caught on same site on 4/3/51.
301821	4/3/50	1	5/17/51	0	
301822	4/3/50	2	4/6/51	440 yds.	1950 site unoccupied. Another bird using 1951 site on 5/22/51.
301829	4/7/50	2	4/15/51	1 $\frac{1}{4}$ mi.	1950 site unoccupied. Another bird using 1951 site on 5/24/51.
301846	4/22/50	2	4/6/51	5 miles	Another bird using 1950 site on 4/25/51
301849	4/23/50	2	4/11/51	1100 yds.	Recaptured on different site 4/10/51. Returned to original site.
301834	4/11/50	2	4/8/51	1540 yds.	Killed in trap by weasel.
301869	5/4/50	3	3/30/51	660 yds.	Two new birds caught in 1950 site. Two others also caught on 1951 sites.
301871	5/10/50	1	5/11/51	0	Other birds also caught on 4 sites used by this bird.
301875	5/10/50	2	5/8/51	1485 yds.	
301887	4/26/50	4	5/3/51	1 $\frac{1}{2}$ mi.	
301900	4/28/50	2	4/26/51	200 yds.	Only the approximate (approx.) capture site of 1950 is recorded.
301960	5/18/50	2	4/26/51	1 mile	
301918	5/21/50	1	4/12/51	0	

Table 2.--Movements shown by repeats of 1950 captures

Number Series 50-	Date first captured	Number of sites on which captured	Date last captured	Greatest distance moved from original capture site	Remarks
301704	4/10/51	2	5/18/51	275 yds.	This bird was retrapped on his original site May 18.
301705	4/7/51	2	5/23/51	880 yds.	
301708	4/18/51	1	4/19/51	0	
301712	4/25/51	1	5/23/51	0	
301713	4/14/51	1	5/20/51	0	
301714	4/12/51	1	5/18/51	0	
301719	4/17/51	1	4/23/51	0	
301731	5/4/51	1	5/15/51	0	
301772	4/14/51	2	5/16/51	1 $\frac{1}{4}$ miles	
301778	4/20/51	2	4/22/51	820 yds.	
301779	4/6/51	1	5/17/51	0	
301913	4/3/51	1	5/19/51	0	
301974	4/21/51	3	5/16/51	1 $\frac{1}{4}$ miles	
301977	4/25/51	2	5/16/51	1 $\frac{1}{3}$ miles	
301982	4/18/51	2	5/23/51	385 yds.	
301987	4/15/51	1	5/24/51	0	
301989	4/15/51	1	5/24/51	0	
301995	3/31/51	1	5/18/51	0	
301996	4/2/51	2	4/6/51	500 yds.	
301992	3/29/51	2	4/8/51	660 yds.	
301993	3/30/51	2	4/2/51	100 yds.	

### Monogamy

The trapping returns suggest male singing woodcocks are extremely promiscuous. The pertinent data supporting this observation are for the most part included in Tables 1 and 2 and may be briefly summarized as follows:

(a) It is not unusual to find the same singing male attempting copulation with different decoys at widely separated singing sites.

(b) Some birds decoyed in early April were just as susceptible late in May.

(c) Birds have been observed visiting singing grounds of other males and attempting copulation with a decoy after May 15 when presumably most males should be mated if monogamy is the rule.

(d) Birds were just as easy to decoy after the height of the hatch in this area as in early April. No indication of falling off in breeding activity was observed until mid-May.

(e) There were two instances of observing a male copulating with a female and captured with a decoy a few days later.

(f) There was one instance of a male observed copulating with a decoy while a live female was on the singing ground 8 feet away. It could not be proved the other bird was a female but the observer was within a few feet and the size and actions of this bird were typical of other females seen on singing grounds.

(g) In two cases two males were using the same singing ground and in each case was captured, the trap reset and the second male attempted copulation with the decoy.

(h) Broods and hatched nests were found in close proximity to males which readily decoyed in May.

It is difficult to believe that a male woodcock will continue a courtship display for two months and confine himself to mating with one female. It is possible, of course, that a female may visit only one singing ground. However, if the hen begins brooding a clutch of eggs in mid-April, and the nest is broken up near the end of the incubation period there are good chances a different male may be occupying the ground where she found her first mate. It seems unlikely she would seek her original mate for a second clutch particularly if he had moved a mile to a new singing ground, and there were several singing males occupying intervening territories between his original singing field and the site chosen later in the spring.

There may well be other reasons for the movements of males from one singing ground to another. It is possible that in certain locations no mate is found although in some of the concentrated breeding grounds described in this study such a situation appears unlikely. Some observers might well question whether trap capture may not induce a bird to move. Experience and observation tend to refute this idea. Birds were repeatedly retrapped during 1950 and 1951 on the same sites. When visitors were taken afield to observe the trap in operation we invariably reset a trap where a bird had been previously captured since there was a greater chance it would be successful.

Other unknown factors involved may have to do with the physiology of individual birds and the differences, if any, in gonad development.

### Arrival Dates of Resident Birds

In the consideration of the foregoing data one logically poses the question as to what percentage of the birds trapped in April may have migrated north by late May. Conclusive answers on this and the apparent occurrence this spring of two migration waves can only be answered by future returns of banded birds.

It is well at this time to analyze the information gathered to date in this study which has a direct bearing on this problem. The results of a census conducted systematically twice a week on 3.8 miles of road in Quabbin Reservation by a special student is presented in Table 3 and graphically portrayed in Figure 1.

In addition to this census Table 4 presents the results of a census taken by R. T. Norris in Essex County near the northeast coast of the state. Although this is not as complete as the data presented in Table 3 it provides additional data worth considering.

It is noteworthy that after the height of migration between April 8-10 there was a sharp decrease in the count in both areas, a condition to be expected. However, there was no evidence in either area of another build-up until after May 1. Norris's results in 1950 taken at different dates show little difference in the census count between April 13 and April 26. The highest count occurred on May 5. The same trend in population change which was noted this spring was indicated but in a less striking manner.

A careful analysis of weather conditions eliminated weather as the factor which could account for large variations in the count (Table 3).

Referring to Table 1 it will be observed that six recaptures from the spring of 1950 were taken before April 13 and 5 of these were caught from the end of March to April 8 during the height of the migration. Although caught at a later date direct observation with binoculars on bird 50-345302 revealed a band on his leg two days after his arrival. He has returned to his singing ground the last two years on March 27. During retrapping this spring in late May none of last year's birds were captured which had not already been taken in April or late March. What fragmentary evidence there is indicates that males which bred in this area a year ago returned in late March or early April in the first influx of migrants. Further supporting data from Table 2 shows that seven birds banded this spring from the end of March to April 7 all were recaptured in late May.

Table 3.--Census of singing male woodcocks on Prescott Road, spring 1951

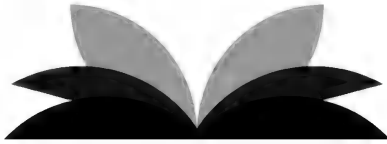
Date	Number of Birds	Relative Humidity	Temp. at 8 P. M.	Wind Dir.	Vel.	Precipitation
3/22	4	87	27	Var.	4	.17
3/27	10	57	39	"	4	--
3/29	11	96	46	E	1	.45
4/3	16	80	40	NE	17	1.64
4/5	19	70	45	E	4	--
4/10	27	90	52	Var.	0	.23
4/17	10	67	42	NE	8	--
4/19	10	60	47	NE	1	.07
4/26	10	65	54	SE	1	.03
5/1	18	49	61	Var.	0	--
5/3	17	50	52	S	6	--
5/8	22	47	62	NE	1	--
5/10	16	60	56	Var.	0	--
5/15	14	65	72	Var.	1	--
5/17	12	96	51	NW	10	.01
5/22	8	87	75	Var.	1	?

Table 4.--Census of singing male woodcocks taken by R. T. Norris in the  
Newburyport Area, Essex County, Mass. in 1951

<u>Date</u>	<u>Number of Birds</u>
3/26/51	19
3/28/51	29
4/8/51	32
4/28/51	17
4/30/51	14
5/6/51	23
5/12/51	24



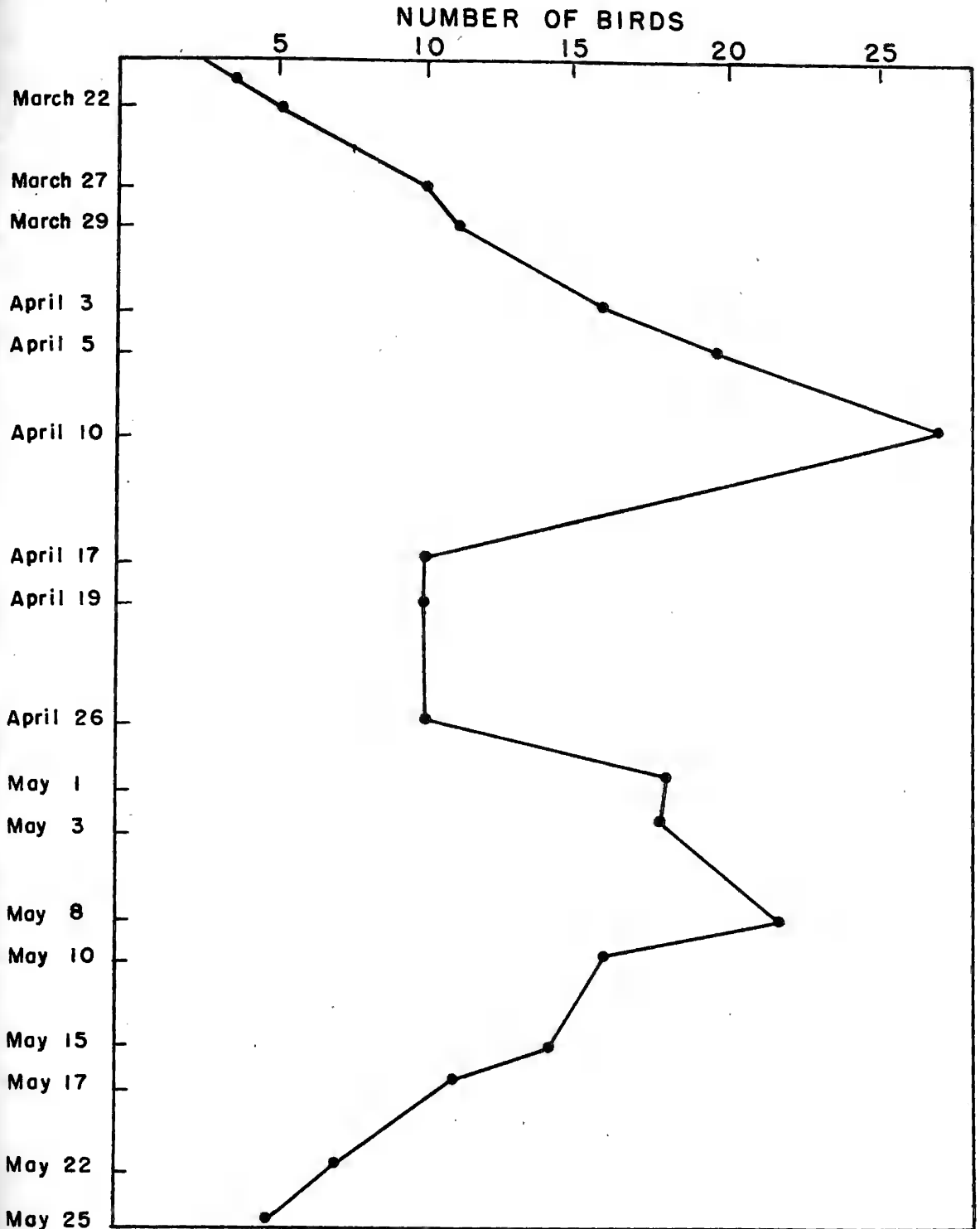
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Figure 1

Census of Singing Male Woodcocks on Prescott Road, Spring 1951



The census results prompted Unit personnel to return in late May and retrap 63 sites on Prescott peninsula which had been trapped in April. The results of this have been discussed under the section on movements, but the 8 new birds caught on sites holding other birds in April would suggest one of three possibilities: either the original occupants had migrated north, shifted their singing territory, or suffered mortality. The latter possibility appears remote in the light of observations on spring mortality.

In two of the 8 sites where new birds were taken late in May the original occupant was also caught in a dawn flight indicating two birds in each case were using the singing ground or closely adjacent ones late in the breeding season. Three of the sites holding new birds had taken three birds banded in 1950 during April and therefore, presumed to be residents. One of these 3 sites had caught a third bird in late March which was unaccounted for in the late May retrapping. The remaining 3 sites which yielded new birds in May had taken April birds on April 10, April 17, and April 18 respectively. Only one, therefore, had taken a bird during the height of the migration.

In summary, analysis of these few returns points to a shift of singing grounds in most instances. Two of the birds caught in April may have been migrants but this is unlikely for the ones caught April 17 and 18. In addition, bird #50-3019 had been banded April 25 and was recaptured May 16, 1 1/3 miles north of his April singing site. These new captures lend inconclusive evidence to the theory that a late wave of birds came in during late April or early May as the census results suggest. During the late retrapping, two additional new birds were caught on sites not occupied in April.

If there is any truth in the theory of a second migratory wave the origin of these late birds is difficult to explain. Another possibility is that there is more than one height of breeding activity during the spring. All data are insufficient to be significant.

#### Counting Singing Males as a Census Method

The behavior of breeding males as revealed by trapping may help in a more accurate interpretation of the results of the annual census counts on singing birds. Other investigators have reported males shifting singing grounds during the spring. How such an assumption is arrived at has not been clearly described. Without knowing the identity of individual birds it would seem difficult to be sure of such a behavior pattern. Results of trapping demonstrate that many individuals do shift singing grounds, but this was not apparent in census runs since all recaptured

males were caught on other singing grounds, most of which had been used off and on throughout the spring. When Prescott peninsula was retrapped in late May two birds were caught on new singing grounds closely adjacent to those where birds had been caught in April. Both of these birds were unbanded individuals suggesting they had moved in subsequent to the April trapping.

Between March 29 and April 14, 19 birds were trapped on 18 singing grounds in the 3.8 miles of road regularly censused by a special student (Figure 1). Attempts to trap two additional birds failed. One would assume that many of these trapped individuals were migrants since the census suggests April 8-10 as the height of migration. Six of these 19 were recaptures from the spring of 1950 so were presumed to be residents. Two additional birds were taken as repeats in late May trapping leaving the possibility that 11 were migrants. Seven birds were captured between May 16 and May 22. Three were repeats of 1950 birds caught in the same sites. Two were repeats of birds banded in April, both of which were first caught over a mile away, while two were new birds. During the spring 23 individual birds were caught on singing grounds in this census route. Due to the fact trapping was carried on over a long interval of time the trapping results in this instance help little in interpretation of the census results. During three checks between April 17 and April 26 only 10 singing males were counted (Table 3). The count built up towards the end of April, reaching a second peak May 8. What evidence was gathered in late trapping suggested some new arrivals, and a good deal of shifting by local males. In most instances, however, throughout the peninsula new birds, as well as repeats, were taken on old singing sites and census runs revealed practically no new singing grounds occupied.

As the writer has interpreted these data the count of May 8 or 10 would seem the best indicators of the breeding population. Likewise in the Newburyport area (Table 4) the count of May 6 or May 12 should be used. These results suggest the importance of running census counts late in the breeding season. In this area in 1951 the first week of May appeared to be the best time for the annual inventory in spite of the fact it coincides with what is probably the height of the hatch. Censuses will be taken regularly throughout the spring, however, for several years to discover whether the pattern evident the past two seasons is consistent.

Another extremely variable factor in censusing by counting singing males is the perceptiveness of different personnel in hearing either the "peent" note or the flight song of males. A few tests were run here demonstrating that in a group of observers of otherwise normal hearing there were great differences in their ability to hear the frequency of the male woodcock's notes. Some could hear "peents" clearly but could scarcely pick up the flight notes. There were cases of the reverse. Counts varied as much as 20 percent depending on the observer. Therefore, it is of great importance that the same observers census the same routes every year insofar as possible.

In view of the variables involved at least six counts would seem advisable for all census runs. As shown above 3 runs between April 17 and April 26 on a route in the central part of the woodcock's breeding range would have revealed half or less of the actual breeding population.

In summary tentative recommendations would include:

1. Six runs wherever possible including counts late in the breeding season.
2. Whenever feasible have the same person census the same route. In the case of student groups the results from year to year are probably comparable.
3. A careful study by trapping and marking (so individual birds could be recognized visually) all singing males on a particular census route which would be censused regularly throughout the spring. The trapping and marking program would be closely coordinated with the census runs. This would require the services of two men throughout the breeding season.
4. A study of one individual resident male, keeping a complete record of his breeding activity from his arrival in late March until he ceases his singing in late May. This would ideally require at least 5 nights a week and would help to gauge the reaction of one individual bird to weather conditions, and to determine if his breeding activity varied with any consistency.

#### Annual Population Turnover 1950-51 based on Trapping Results

The data provided by trapping on population turnover is admittedly meagre, but since it is believed to be the most complete on record it seems worth reporting in some detail. Two more seasons of continued trapping operations will yield far more complete information.

In 1950, 81 adult males were trapped at 76 sites. In 1951, 21 of these sites were not retrapped. Several were in scattered places in the state where cooperators had picked up birds by trapping the year before. The large majority were accessible only by a jeep which was not available this spring. One of the birds captured and banded in 1950 was quite badly injured and 2 others were held for purposes of photography and released elsewhere. Four woodcocks occupying sites where birds were captured a year ago were not captured this year. This makes a total of 28 birds which were not counted in the population turnover calculations.

Out of the remaining 53 birds, 18 were recaptured giving a minimum recovery of 34 percent and suggesting a replacement of 66 percent of last year's adult males. The actual replacement is undoubtedly lower for two reasons. Several of the birds taken in 1950 were trapped before and during the height of the migration. As discussed in a previous section the changes are that many of these are resident birds. However, in the instance of site #1 where 4 different males were captured on successive nights in late March and early April it would seem probable some were migrants. Thus, the recovery figure would be somewhat higher. Secondly, as demonstrated by trapping results discussed under the section on homing instincts it is probable some males had returned to new singing grounds not covered by this year's trapping operations. The best estimate in the writer's opinion would be a minimum return of 37 percent of last year's adult males.

The annual census on Prescott peninsula, Quabbin Reservation revealed a population substantially the same as 1950. Using a production potential of 3.88 chicks per pair (Mendall and Aldous 1943) and assuming an even sex ratio these results indicate an approximate annual mortality rate of 63 percent of the adults and 67 percent of the juveniles. It is further assumed of course that the 63 percent replacement is made up of young produced the previous year. Such figures suggest an extremely low mortality of woodcock chicks and what would appear a high mortality of adults. The results in subsequent seasons may throw additional light on the validity of these figures which are quite inadequate.

#### Woodcock Breeding Population in Quabbin Reservation

Mendall and Aldous (1943) pointed out the possible importance of setting aside refuges for woodcocks as a productive management technique.

At the present stage of vegetative succession Quabbin Reservation comprises 88,000 acres of upland, much of which is excellent woodcock breeding habitat. Since the area is closed to all hunting it is the writer's opinion that at present it acts as a large woodcock breeding refuge.

Method of Estimating Woodcock Population in Quabbin Reservation.--- Except under very unusual circumstances a singing woodcock cannot be heard farther than slightly over 200 yards from the road. Most of our trapping sites were well under this distance. In certain terrain there must have been some birds within this distance which were not audible. It was estimated that a mile of road covered a maximum band of cover 440 yards wide totaling 160 acres. By measuring the total miles traveled in the reservation and counting only singing sites an over-all total of acres per breeding pair was calculated for the area covered. Since trapping demonstrated that there were usually more singing males in a stretch of road than sites it is believed the estimate is a conservative one.

Population.--A total of 42.2 miles of road totaling 6,752 acres of the reservation were driven. The country covered included several miles of large hardwoods which held no breeding birds. Although a sample of only 7.7 percent of the total Quabbin acreage was covered it is fairly representative of the total area. It would be logical to expect a higher number of birds along roads if the latter followed only open valleys with streams. However, the heaviest concentration of breeding birds were found in high former pasture land, well removed from streams and planted to spruce and pine. Much of this type of country was not covered during the spring.

Assuming the acreage traversed comprises a fair sample, the number of singing grounds found amounted to 134. Further assuming there to be no more than one pair to a singing ground the over-all average would be 50 acres per breeding pair. Actually the best areas held as many as a pair to 8 acres. Applying this to the total 88,000 acres, there would be approximately 1,760 breeding pairs in Quabbin Reservation with a production potential of 6,000-7,000 chicks.

#### Coniferous Plantations as Woodcock Breeding Habitat

Planting conifers is widely accepted as a technique to attract several species of upland game to sub-marginal land. Although soil types, surrounding cover and some other factors are part of the ecological habitat required by woodcocks it is a striking fact that in most areas throughout central Massachusetts evergreen plantations attract breeding woodcocks. Many found outside Quabbin Reservation used old fields growing back to white pine. Since planting these trees often protects watersheds and eventually produces lumber, the possibility of the practice of increasing woodcock breeding territory warrants careful scrutiny by the game manager.

It is anticipated that this study will eventually include a careful ecological study of these breeding areas. Undoubtedly an isolated plantation with no surrounding hardwood cover would not be suitable for woodcocks.

Quabbin Reservation offers the rare opportunity of tabulating breeding densities of woodcocks in plantations of known ages and comprising red and white pine, Norway spruce and larch. The pines predominate.

Even-aged plantations varying from 15 to 4 years of age were trapped. It is probable that as the stands reach an age where the understory is relatively clean and openings are closed over there will be fewer breeding woodcocks.

No detailed data are offered here, but two general observations are of interest. On the younger aged plantations where there were acres of open potential woodcock singing grounds the breeding density was no heavier than in the older aged stands. Every available opening appeared to be used in the older stands. A second general observation is that the clean bottoms of coniferous stands over 20 years of age appear to be attractive resting places for woodcocks in hot weather.

### Predation

It is possible an attack on a woodcock decoy is only a rough indicator of potential woodcock predators. The most persistent attacker was the crow. Several of the latter were caught or sprung traps late in the evening just before the singing period. A Cooper's Hawk and a Sharp-shinned Hawk were also captured with a woodcock decoy.

One bobcat sprang on a decoy but it seems doubtful this predator takes a heavy toll of birds. The bobcat population in Quabbin Reservation is relatively high. Several were seen during the spring trapping. It should be easy for one of the cats to catch a singing male, but no instance of actual predation was found. One destroyed woodcock nest contained a freshly deposited bobcat scat offering circumstantial evidence that one of these mammals may have been the guilty predator.

One woodcock was destroyed in a trap by a weasel. Its head was severed and there was a hole under the net frame made by the weasel.

A Horned Owl was observed to dive on a singing male just as the latter flew. The owl narrowly missed capturing it.

Relationship of Woodcock with two other Game Mammals.--It was of interest that a cottontail rabbit was observed feeding a few feet from a peenting male and neither seemed disturbed by the other's presence.

On Prescott peninsula in Quabbin Reservation there is a high population of deer and many parts of the area are heavily over-browsed. It is possible that there may prove to be a relationship between deer and woodcocks in that the former may retard natural succession in the breeding areas and maintain favorable habitat for woodcocks longer than would occur elsewhere.



## WOODCOCK BANDING WITH BIRD DOGS

Bruce Wright

Wildlife Management Institute

The following is a summary of the results achieved to date in banding woodcock with bird dogs. The banding was done on the woodcock study area of the Northeastern Wildlife Station near Fredericton, New Brunswick. The cover was the typical nesting cover of the north-east, a young birch-aspen stand with scattered conifers over a ground cover of leaf-mold and bracken. The bracken present at the time of the banding is the remains of last year's growth, and not new growth.

### Dates

The dates on which banding was done were May 19, 20, and 22 in 1950; and May 10, 11, 12, 13, 14, and 17 in 1951. Banding should only be done in dry weather as disturbance during rain may be lethal to day-old chicks.

### Age of Chicks

Chicks were banded ranging in age from 1-12 days. The 12-day old chicks were just able to fly, but not proficient enough to escape capture.

### The Method

The method consisted of working a trained dog through the cover from the down-wind side. The broods are pointed by the dog. Only staunch dogs may be used as the young are completely at the mercy of the dog until the dog-handler arrives and snaps a lead on him. When the dog is secured a hand net 3-feet in diameter with a 6-foot handle is placed over the female and young. With very young chicks the female and all four chicks may be caught in the net together, but more usually the young are scattered within a 10-foot radius of the female and great care must be taken that they are not stepped on when netting the female. Even the weight of one hind foot of a light setter bitch was enough to kill a chick on one occasion, and the dog did not even know it had stepped on the bird. They are extremely well camouflaged and will "freeze" perfectly. It often happens that one or two of the chicks are found but the last two cannot be found. Therefore, it helps if the chicks in hand start to "peep", as the ones still in hiding will answer them and give away their location. When the chicks are 1-3 days old the female will often allow the net to be placed over her without moving, but from the age of 3 days on she is much more wary and will flush as the net approaches. The 6 females taken so far were all with broods 3 days old or younger.

### The Results

In 1950, the first year of the study when time had to be spent in locating suitable areas, 2 females and 30 young were banded in 3 working days. In 1951 the same area was used and 3 females and 45 young were banded in 6 working days. A total of 5 females and 75 young, or 80 woodcock, have been banded in 9 working days by a 2-man party using 2 dogs. Each dog is used separately, and 2 are needed as the working day of a dog on this work should not be more than 5 hours if he is to be used continuously over a considerable period.

### Conclusions

This method is economical in man-power and time, and has produced results which indicate that it is the best method so far developed for banding females and young on the breeding grounds. The major weakness is that the adult males are not taken, but when this method is used in conjunction with one of the methods for taking singing males such as trapping with dummy females, decoys, or tape recordings of the male's "peent," it appears to offer the best opportunity for saturation banding on a specific area.

The study is continuing, and the possibilities of color marking are being investigated.

## WILSON'S SNIPE WINTERING GROUND STUDIES, 1950-51

Chandler S. Robbins

U. S. Fish and Wildlife Service

From January 8 through February 8 the writer carried on investigations on the wintering grounds along the Gulf coast from Pensacola, Florida, to Galveston, Texas. These investigations included testing various census methods, obtaining preliminary census data for future comparisons, conferring with local field men, and trying various methods of trapping snipe for banding.

Census methods.--Since the winter distribution of the Wilson's Snipe varies from year to year and even from week to week as a result of changing water levels, this is a very difficult species to census. Any one of a great many variable factors may produce shifts in local wintering populations, and these shifts quite frequently may cause apparent changes in abundance which are much greater than any actual changes, and which bear no relation to increases or decreases in the population as a whole. Some of the factors influencing snipe distribution in mid-winter in the Gulf coast states are:

- (1) Water levels in the uplands as influenced by recent and accumulated precipitation and by rate of evaporation;
- (2) Water levels in well-drained tidal areas as influenced by position of moon, direction and velocity of wind, storms, construction of new canals, etc.;
- (3) Water levels in poorly drained brackish marsh as influenced by storm tides, precipitation and evaporation;
- (4) Amount of grazing;
- (5) Human disturbance, including legal and illegal shooting;
- (6) Rotation of crops, especially rice;
- (7) Changing of farm practices and crops due to labor costs, new machinery, etc.;
- (8) Natural edaphic changes; land becoming drier;
- (9) Reclamation projects;
- (10) Cold weather locally or to the north.

Due to these many disturbing factors, and due to the fact that subsequent counts in a given area result in significant changes in the number of snipe recorded even when none of the above factors are known to have interfered, a great many sample counts are necessary to obtain a reliable index to the population of the snipe on its wintering grounds.

1951 counts.--The following counts scattered throughout the area visited in January 1951 may serve as some basis for future comparisons, but it is planned to initiate much more extensive counts starting with the winter of 1951-52.

Wilson's Snipe - Summary of winter investigations on Gulf coast  
January-February 1951

Date, 1951	County, State	Locality	No. of Snipe	Unit of Measurement
Jan. 12	Baldwin, Ala.	Mobile Bay Causeway	45	20 min. SW of Cafe
		"	60	15 min. NW of Cafe
Jan. 13	Harrison, Miss.	Lyman Fish Hatchery	3	SE pond
Jan. 16	Plaquemines, La.	Port Sulphur	20	5 min.
	"	"	10	2 "
Jan. 18	"	"	32	15 "
Jan. 18	Terrebonne, "	E. of Houma	320	20 "
Jan. 20	Cameron, La.	Sabine Refuge, La.	83	2 1/4 A. 8 a.m.
Jan. 21	"	" (same area)	43	" 9 a.m.
Jan. 21	"	"	18	" 3 p.m.
Jan. 23	"	"	47	" 11 a.m.
Jan. 25	"	"	20	" 6 p.m.
Jan. 26	"	"	8	" 7 a.m.
Jan. 26	"	"	5	" 10 a.m.
Jan. 26	Cameron, La.	N. of Creole	11	1 acre
Jan. 24	Galveston, Tex.	opp. Airway Cafe	15	10 min.
	Harris Co., "	Houston to 20 mi. W.	1	
Jan. 27	Cameron, La.	Lacassine Ref.	10	Boat to school section
		"	95	School section
		"	5	Return from school "
Jan. 28	Jeff Davis, La.	Jennings	17	Pelican farm
	Vermilion, La.	Guaydan	69	Dore farm
Jan. 31	Pte. Coupee, La.	Lottie	17	6 hr. after dark
Feb. 2	Orleans, La.	Pte. aux Herbes vicinity	5	3 min.
	"	"	27	20 "
	"	"	8	7 "
	"	" (hard frozen)	0	8 "
	"	"	0	4 "
	"	"	0	10 "
	"	"	2	2 "
	St. Bernard, La.	Chalmette dog race	36	16 "
Feb. 4	Iberville, La.	Spanish Lake	17	10 "
	"	"	5	5 "
	"	Jones pasture	27	10 "
Feb. 5	Plaquemines	Port Sulphur	9	1 1/2 "
	"	"	0	3 "
	"	"	12	11 "
	"	"	11	7 "
	"	"	2	3 "
Feb. 6	Baldwin, Ala.	Mobile Causeway	99	15 " SW of Cafe
	"	"	50	11 " NW of Cafe
	"	"	4	4 " NE of Cafe
	"	"	36	2 " SE of Cafe

Status in 1951.--Without sample count data from previous years, it is necessary to rely on statements from Federal and state biologists, refuge managers, game wardens and other active field men regarding status of the snipe in 1950-51 as compared with recent winters.

Dry weather, particularly in eastern Texas and western and northern Louisiana, definitely resulted in a lower wintering population of snipe in those areas during the present season. That some of the birds from the drought area may have wintered in the coastal marshes to the south is suggested by an increase (more than for several years) on the Sabine Refuge in southwestern Louisiana. The only other increase reported was along Chenier au Tigre near the coast of central southern Louisiana; in the marsh land just to the north of the chenier, however, the snipe was definitely less common this year than in the past few years. As far south-east as Baton Rouge, low water levels were at least partly responsible for the fact that the snipe was much scarcer than in the previous year. Along the bayous south and west of New Orleans, however, where water levels were favorable, snipe were still scarcer than in the previous year.

Effects of Gulf Coast Ice Storm, January-February 1951.--The severe ice storm which occurred in the Gulf States in late January and early February was described by newspaper men as "the worst ice and snow storm ever to hit Louisiana and Mississippi." Some snipe mortality very likely resulted, but this was very minor compared to the disastrous freeze of ten years ago. The present freeze lasted only 3 or 4 days in the Opelousas--Baton Rouge area, and enough patches of open water remained to enable snipe to do some feeding. Furthermore, the dry fall and early winter had already driven most of the snipe into the coastal marshes (or farther south), where the freezing rain did not occur. During and immediately after the ice storm the writer accompanied Professor Leslie Glasgow on woodcock banding trips in the area near the southern limit of the continuous freeze. Only a small proportion of the woodcock (trapped by jack light and net) showed an appreciable loss of weight, and the only snipe captured was in good flesh. Two or three dozen Killdeer also were handled, and only one of these was seriously underweight. Interviews with trappers in the Mississippi Delta area revealed that there had been no appreciable influx of snipe in that section during or just after the ice storm.

Data from Christmas Season Counts.--The Christmas bird counts published in Audubon Field Notes can be counted upon to supply supplementary data for a snipe inventory, but are not adequate in themselves since too few counts are taken in the areas of greatest concentration. Counts from 70 snipe-reporting areas that have been covered each of the past four years give the following numbers of snipe per 100 party-hours 18.1 in 1947; 15.2 in 1948; 15.4 in 1949; and 16.0 in 1950.

## WILSON'S SNIPE SINGING COUNTS IN EASTERN CANADA - 1951

Victor E. F. Solman

Canadian Wildlife Service

Trends in numbers of singing male Wilson's Snipe have been studied in eastern Canada in connection with somewhat similar studies in relation to woodcock. Male Wilson's Snipe perform over a wide area and do not appear to have a fixed singing time or area to the same extent as woodcock. For these reasons, reliable counts are difficult to secure. As in the case of woodcock, the relation between the number of singing male birds and the breeding population is not known.

### Ontario

In both the Kingston and the Ottawa areas, numbers of singing male Wilson's Snipe have increased by at least 50 percent from 1950 to 1951. This brings the numbers to about an average value for the three years for which data are available.

### Maritime Provinces

In New Brunswick the limited comparative data available suggest a decrease in numbers of singing male birds from 1950. The data from New Brunswick would not be considered significant alone but a similar trend, of about equal amount, is shown in the adjacent Province of Prince Edward Island from which more extensive data are available. In Nova Scotia, limited data suggest a large increase in singing male birds since 1950. The data for the three Maritime Provinces suggest a decline of about 25 percent from 1950 to 1951, giving a total number somewhat below the long-term average for the areas.

Wilson's Snipe Singing Counts - 1951

Province	Census Area	Numbers of Occupied Singing Grounds			No. of Years	Observer 1951
		1950	1951	Average		
Ontario	Ottawa (Stittsville)	2	5	3.7	3	R.D.Harris & V.E.F. Solman
	Ottawa (Carp)	2	3	2.7	3	" "
	Ottawa (Vars)	4	7	5.0	3	" "
	Ottawa (Cumberland)	2	0	1.0	3	" "
	Kingston (Cataraqui)	6	0	7.7	3	G.M.Stirrett
	Kingston (Westbrook)	3	4	2.7	3	" "
	Kingston (Perth Road)	0	5	3.3	3	" "
	Kingston (Holleford)	3	11	8.3	3	" "
	Nova Scotia Truro (New Annan Rd.)	2	4	3.0	2	H.R.Webster
	Truro (Camden Rd.)	2	3	2.5	2	" "
Prince Edward Island	Avondale	9	5	7.8	4	" "
	Conway	10	6	6.0	4	" "
New Brunswick	Moncton (Turtle Creek)	0	0	0.5	4	J. Mayer & H.R.Webster
	Tabusintac (Price Sett.Rd.)	2	1	1.0	4	" "

In view of the limited data available from the small number of survey areas and the difficulty of ensuring the accuracy of the data, it is felt that although the number of singing birds on check areas reported upon has increased from 47 birds in 1950 to 54 birds in 1951, no increase in hunting opportunities for this species is considered desirable.

# WILSON'S SNIPE BREEDING GROUND STUDIES IN MINNESOTA, 1951

Chandler S. Robbins

U. S. Fish and Wildlife Service

Breeding ground studies of the Wilson's Snipe were reported on for 9 different areas in Minnesota during 1951. Unfortunately there are no previous data for comparison on these areas, but the following counts of winnowing birds may serve as a basis for comparison in future years.

In the following table, "maximum trip" refers to the greatest number of snipe recorded per trip; "average" refers to the average number for all trips; and the "total" represents the best estimate of the breeding population as determined by examination of all available trip records. The "total" column, then, gives a minimum population estimate which, in the case of areas censused several times, is believed to be reasonably accurate. However, areas in which only one or two trips were made, the number is believed to be below the actual population.

County	Locality	Dates	Miles	Max. trip	Aver.	Total	Observer
Aitkin	Aitkin (Fleming Rd.)	4/25	10	10		10	W.Petraborg
Aitkin	"(Highway 56)	4/28	11	19		19	" "
Aitkin	Aitkin (Nord Lake Rd.)	4/30, 5/10	4.3	2	1.0	2	" "
Aitkin	"(Cedar Lake ")	5/3, 5/?	4	3	2.5	3	" "
Anoka	Carlos Avery Refuge	4/27, 5/7	3.4	12	9.5	13	Forrest Lee LWKrefting
Dodge	Oslo Road	4/23, 27, 29, 5/7	4.5	4	2.25	6	?
Marshall	Gatske (Thief L. (So. Patrol)	5/19, 16	4	8	7.0	11	Robert Farmes
Martin	Ceylon (Ceylon Bridge)	4/23, 26; 5/7	4/1	2	1.5	2	D.H.Ledin
Martin	East Chain (Rose L. to Sager L.)	4/17, 25; 5/8	4	2	1.0	2	D.H.Ledin



# WILSON'S SNIPE POPULATION AT GRAY'S LAKE, IDAHO

Thomas D. Burleigh

U. S. Fish and Wildlife Service

This study was started on May 21, 1951 and concluded 8 days later on May 28.

At the beginning there was some question as to the best time to census the breeding snipe population, so for several days counts were made both in the early morning and at dusk. It was soon apparent that the early morning was unsatisfactory for an accurate count. Snipe were in the air to some extent from daylight until 8 A.M., but their "winnowing" was of short duration, and the count was so low in comparison to that made in the evening that there was little question that many individuals were inactive then. At no time were any heard from shortly after 8 A.M. until approximately 6 P.M.

The method employed in making this census of the breeding snipe was as follows: An initial station, No. 1 was established at the point where the road from Gray, Idaho entered the main highway north and south that parallel Gray's Lake on its east side. With this as a starting point, successive stations were established at half mile intervals for a distance 9 miles north of this road intersection, and 8 miles south. This made it possible to cover with reasonable accuracy almost the entire length of the lake on its east side. Half mile intervals were decided upon after a number of tests were made to determine how far away a flying bird could be distinctly heard. Closer stations would have involved possible duplication. At half mile intervals it was believed no duplication resulted, while on the other hand longer distances would have unquestionably meant an incomplete count. Consequently for the duration of this study 18 stations were established on the north end of the lake, and 16 on the south end. Under the circumstances a car proved ideal for this purpose. Mileage between stations was carefully checked, and at each established point "winnowing" snipe were recorded during the 8 days that this study was carried on.

The results of this population study indicate a large breeding population of Wilson's Snipe at Gray's Lake. It is realized that because of the many factors involved the figures obtained must be accepted as more or less an estimate of the actual number of birds in this area in 1951. Important factors in obtaining an accurate count include:

1. The actual hour at which each individual count was made. As mentioned before the morning hours proved entirely unsatisfactory. At night the best time appeared to be between 7:30 and 9:00 P.M. Earlier in the evening the birds were not in the air as consistently, while after 9 P.M. there was a marked drop in the numbers of the birds heard.
2. Weather conditions. This was found to be an extremely important factor. Maximum counts were made on still clear nights, whereas adverse weather cut down the count materially. On May 24 it was partly cloudy, with a strong cold west wind, and but 7 birds were counted at the north end of the lake between 7:50 and 8:45 P.M. In contrast, the following night was clear, with no wind, and 16 birds were recorded at the same stations, and at the same hour. On two occasions rain apparently discouraged the birds from flying when the count was half completed, this resulting in a low count for the evening.
3. Activities of the individual bird concerned. Although the male remained in the air for long intervals, he was noted from time to time dropping to the ground, where he would remain for an indefinite period. Consequently when no birds were heard at stations where on previous nights one had been noted, it is logical to assume that the individual in question was then feeding or merely resting. Obviously this reduced the count. Finding a bird in the air when a scheduled stop was made (and frequently 5 minutes or more were spent in careful listening) was apparently a matter of arriving at an established station at an opportune moment.
4. Breeding activities of individual pairs of snipe. A possible factor in an accurate count is the possibility that the males cease their "winnowing" flight when the young have hatched and demand the attention of both parents. The Wilson's Snipe arrived in numbers at Gray's Lake shortly after the middle of April, and if they nested at once their young would in many cases be out of the egg by the end of May. This was true of the Long-billed Curlew; it arrived at Gray's Lake at approximately the same time as the Wilson's Snipe, and downy young were seen on May 25. At present writing no information is available concerning the activities of the Wilson's Snipe after the young have hatched, but it is felt that this point should be considered in evaluating the decrease noted in "winnowing" males during the course of this study. A total of 28 birds were noted in the air on May 21, whereas a week later the highest count, on May 26, was 17 birds.

As indicated by actual counts made over an interval of 8 days, the breeding population of Wilson's Snipe at Gray's Lake is rather impressive. This lake has a total length of approximately 20 miles, the entire edge of which is bordered by open marsh suitable for breeding snipe. Difficulty of access made it impracticable to attempt a census on the west side, but observations showed conditions there to be essentially the same as on the east side. In the vicinity of Gray, the plowing and planting of such crops as wheat reduced to a slight extent areas suitable for the snipe, but this can be considered a rather negligible factor. The open marsh bordering the lake has a width varying from an eighth to possibly a half mile, the average being probably a quarter of a mile. Each half mile of this marsh would appear to have at least one breeding pair of snipe; in several instances, where conditions were unusually favorable, two pairs were found within this limited area. There are in addition occasional sloughs bordered by open marsh that extend inland for a distance of a mile or more, and these were found to have two or three pairs of breeding snipe. These areas were not included in population studies made, but must be considered in connection with this study.

The following table gives in detail the counts made each day, and the factors involved:

Wilson's Snipe Counts at Gray's Lake, Idaho  
1951

Date	Time	Weather	South Route	North Route
May 21	P.M.	Clear		28
May 22	A.M.	Clear	9	
May 22	P.M.	Clear	15	
May 23	A.M.	Clear		6
May 23	P.M.	Cloudy-light rain		12
May 24	P.M.	Cloudy-strong wind		7
May 25	P.M.	Clear		16
May 26	P.M.	Clear		17
May 27	P.M.	Cloudy-light rain		11

## CLAPPER RAIL STUDIES - 1951

Robert E. Stewart

U. S. Fish and Wildlife Service

### 1951 Breeding Season

As a result of a survey of sample salt marshes in the eastern United States, Clapper Rails were found to be common to abundant in the Gulf coast marshes from east Texas to northwest Florida and in the Atlantic coast marshes from northeast Florida to northern Virginia. Along the coasts of central and southern Florida they were much more local and sparsely populated. On the Texas coast, from Galveston to Brownsville, Clapper Rails were either absent or of minor importance. In Maryland they were much less common than in Virginia due to unsuitable habitat in the former state.

At Chincoteague, Virginia actual counts of nests with eggs in a measured study area showed the adult breeding Clapper Rail population suffered a loss of 40 percent from last year's population. However, the birds could still be considered as being common, and since last year's population was apparently much higher than usual, judging from conversations with local wardens, fishermen and oystermen, it is probable that this year's numbers approaches the normal more closely.

Due to the effects of successive high storm tides, the hatching success of the first sets of eggs laid was less than 45 percent (compared with 94 percent last year). The actual loss this year was probably even greater than this since many of the nests which had not been destroyed were found at the last visit to be completely devoid of cover and, therefore, more vulnerable to predation.

Up to the middle of June many adults were still attempting to re-nest. Some of these were undoubtedly making their third or fourth attempts due to the recurring storm tides.

### Age Classes of Immatures

As a result of high storm tides during the early part of the nesting season the production of young was greatly staggered. The earliest hatching was observed on May 28 (June 1 in 1950) while the latest egg date was Aug. 10, 1951. On this date at Cobb Island, Va., 4 nests with eggs were found. One nest contained 9 eggs that were only one-third developed, while the eggs in two nests (both 5 eggs) were hatching. The earliest fully-developed immature birds recorded were taken in the banding traps on July 19, 1951, while the latest small newly-hatched juveniles were taken on Aug. 16, 1951 (Aug. 20 in 1950). The proportions of the different size groups of immatures during the trapping period are shown in the following table:

	July 16 to 23	July 24 to 31	Aug. 1 to 7	Aug. 8 to 15	Aug. 16 to 23	Aug. 24 to 31	Total
No. of Captures	55	174	122	180	141	264	936
Size:							
Small	60%	45%	15%	5%	2%	-	15%
Medium	27%	40%	65%	78%	70%	79%	65%
Large	13%	15%	20%	17%	28%	21%	20%

The continuous low proportion of the large size group is believed to be due to the fact that most of the large birds leave the area soon after they become fully developed (thus reducing the chances of repeat records). This belief is supported somewhat by some of the recoveries that were reported last year. It is interesting that during the period just before the shooting season (Sept. 1) only 21% of the immature birds were in the large size category (actually only 14% of immatures trapped during this last period were capable of flight). On Aug. 25, 1951, there was an increase of fully grown young rails in the traps. It is possible that this indicates that the first major migration movement was under way at that time.

#### Molt of Adults

During the trapping period most of the adults were undergoing their post-nuptial molt. During the greater part of this molt these birds are completely flightless since the flight feathers are all shed at approximately the same time. The individual molting period lasts about one month. The first adult observed in full molt was trapped on July 21. During the period Aug. 24 to Aug. 31 (period just before hunting season) a total of 11 adults were trapped. Of these only 5 had completed their molt and were capable of flight, while 4 were in heavy molt, and were completely flightless. Surprisingly enough the other two adults had not even started to molt and were in very worn plumage. It is interesting that both of these were still accompanied by young (one-third grown chicks). The latest of these was observed on Aug. 28.

#### Development of Young

The banding records indicate that it takes about 50 days for the young birds to attain full growth and development after hatching. The young birds remain with their parents until they are about half grown, after which they become independent. The larger young may be distinguished from adults by the following characters: Olive-green iris instead of orange or orange-brown; bill pinkish-gray instead of orange-tinged; legs blackish instead of flesh-colored; much less buffy coloration on the breast. Iris begins to change color about the time that the plumage of young is fully developed--at this time often appearing olive-brown. Adult birds were frequently heard emitting a peculiar grunting sound while in the traps. This sound was not heard from young birds until they were fully developed. One fully-developed immature Clapper Rail was trapped which was abnormally spotted with white.

### Local Movements of Rails

Small immature rails--a total of 57 repeat records were made of this size group and all of these were made at same location as original capture.

Medium immature--162 repeat records. 111 (about 69%) were made at points of original capture; 38 (23%) were made between 200 and 300 yards from point of original capture; and 13 (8%) were made from 1/4 to 4/5 of a mile from point of original capture.

Large immature--49 repeat records. 40 (82%) were made at locations of original capture; 7 (14%) were made between 200 and 300 yards from point of original capture; and 2 (4%) were made at greater distances (one 1/4 mile and the other 4/5 of a mile).

Adults--17 repeat records. 14 (83%) were made at locations of original captures; and 3 (17%) were made between 200 and 300 yards from point of original capture.

### Banding

There were many more Clapper Rails banded on their northern breeding grounds in the summer of 1950 than ever before; and a number of these were recovered during the hunting season. The majority of the recoveries were reported by hunters in South Carolina, Georgia and Florida, indicating that a large part of the northern reared birds supply shooting in those states.

In the summer of 1951, 742 were banded at Chincoteague, Va., during the period July 18 to August 31, 1951. Of this number, 68 (roughly 11%) were adults and 674 (89%) were immatures. A total of 295 repeat records were also obtained (189 individuals, repeating one or more times). Only one return was obtained from the 183 rails banded at Chincoteague last year. This bird banded as an immature on Aug. 14, 1950 was recaptured as an adult on July 25, 1951. The total number of Clapper Rails banded in the Chincoteague area (including Modest Town) during the last 2 years is 940 (198 banded in 1950). Ten recoveries (5%) have been reported by hunters from the 198 banded last year.

Eleven rail traps were used this year (traps described in 1951 Transactions of the North American Wildlife Conference). These were visited once a day. The total number of captures of Clapper Rails was 1,038 (742 banded, 295 repeats, and 1 return). The average catch varied considerably. The largest number of captures for one trap was 248 (about 24% of total). The largest number of birds taken in one trap at one time was 17 (all nearly full grown).